

3.4 BIOLOGICAL RESOURCES

This section addresses the impacts of the proposed action and alternatives on biological resources, including vegetation, fish and wildlife, and sensitive species, including those covered and evaluation species that are included in the proposed Conservation Plan. The proposed action is the adoption of the Conservation Plan and the issuance of incidental take authorization. Therefore, this section evaluates the effects of the incidental take of covered species resulting from the implementation of the covered activities, but does not evaluate the covered activities themselves. Impacts include short-term and long-term impacts from implementing the Conservation Plan, as well as impacts associated with the incidental take authorized by the issuance of the section 10(a)(1)(B) permit by the Service.

3.4.1 Affected Environment

3.4.1.1 *Lower Colorado River*

The hydrologic regime and habitats of the LCR have been substantially altered by people so that the river is no longer a continuous ecosystem. The changes include loss of riparian vegetation and floodplains, altered aquatic habitat structure and function, regulated flows, altered water quality (temperature, salinity/conductivity, pollutants), discontinuity of sediment and nutrient transport, and introduction of non-native species (plants and animals).

The dams and their resultant reservoirs have eliminated riparian vegetation and converted large areas of riverine habitat to lacustrine (reservoir/lake) habitat. The dams also pose barriers to movement of aquatic organisms, particularly fish, and regulate flows. This change in habitat structure, along with the release of water from deep in the reservoirs, has altered water temperature, transport of nutrients and sediments, and productivity. Agricultural and urban/industrial developments along the river have altered water quality through input of pollutants and salts, as well as removed riparian vegetation through flood control activities and water diversion. Non-native fish, invertebrates, wildlife, and plants have been introduced to the area and compete with or prey upon native species.

Vegetation

The Conservation Plan uses a land cover type classification system to describe vegetation and other habitat types that was derived from previous classifications (Anderson and Ohmart 1984a; 1984b, Younker and Anderson 1986, Salas et al. 1996, Ogden 1998). Reservoir, agriculture, and developed land cover types have been added for this Conservation Plan. The major land cover types present are woody riparian, marsh, aquatic, desert scrub, agriculture, and developed (Table 3.4-1). The woody riparian land cover type is further divided based on plant community (seven) and structural type (six), and the marsh is divided into seven types based on composition. The amount of each land cover type per reach is summarized in Table 3.4-2. The following descriptions of the vegetation within the land cover types were summarized from the LCR MSCP HCP. Some of these cover types are not carried forward into the impact analysis because little or no effect on species using them is anticipated to occur.

1 WOODY RIPARIAN

2 Currently, approximately 126,000 acres of woody riparian vegetation are present in the
3 planning area. Of this, only 23,000 acres are native cottonwood-willow and honey mesquite
4 land cover types. The remainder is dominated by the non-native saltcedar.

Table 3.4-1. Land Cover Type Classification

<i>Land Cover Type</i>	<i>Characteristics</i>
Woody Riparian	
Cottonwood-willow (6 structural types)	Goodding willow & cottonwood at least 10% of total trees
Saltcedar (6 structural types)	Saltcedar species constituting 80-100% of total trees
Honey mesquite (4 structural types)	Honey mesquite constituting 90-100% of total trees
Saltcedar-honey mesquite (4 structural types)	Honey mesquite at least 10% of total trees (usually <40%)
Saltcedar-screwbean mesquite (5 structural types)	Screwbean mesquite at least 20% of total trees
Arrowweed	Arrowweed at least 90-100% of total vegetation
Atriplex	Saltbush species constituting 90-100% of total vegetation
Marsh (7 compositional types)	1: nearly 100% cattail/bulrush; little common reed & open water 2: nearly 75% cattail/bulrush; many trees & grasses 3: about 25-50% cattail/bulrush; some common reed, open water, trees, & grasses 4: about 35-50% cattail/bulrush; many trees & grasses 5: about 50-75% cattail/bulrush; few trees & grasses 6: nearly 100% common reed; little open water 7: open marsh (75% water) adjacent to sparse marsh vegetation
Aquatic	
River	Mainstem plus tributaries and natural/artificial channels
Reservoir	"Lakes" formed by dams with variable water levels
Backwater	Open water plus marsh, temporary to permanent
Desert scrub	Adjacent to riparian and aquatic land cover types
Agriculture	Active or fallow, adjacent to riparian and aquatic land cover types
Developed	Buildings, roads, campgrounds, landscaped areas
Woody riparian structural types are as follows: I Mature stand with distinctive overstory >15' tall; intermediate class 2-15' tall; understory 0-2' tall II Overstory >15' tall and >50% of trees; little or no intermediate class III Largest proportion of trees 10-20' tall; few above 20' or below 5' tall IV Few trees >15'; 50% of vegetation 5-15' tall and 50% 1-2' tall V 60-70% of vegetation 0-2' tall, remainder 5-15' tall VI 75-100% of vegetation 0-2' tall	

5 Cottonwood-Willow

6 The cottonwood-willow plant community is made up of winter-deciduous trees that reach
7 about 60 feet in height (Holland 1986; Rowlands et al. 1995). Fremont cottonwood (*Populus*
8 *fremontii*) and Goodding's willow (*Salix gooddingii*) are the dominant tree species, although other
9 species of willows may be present as well; and willows are usually more abundant than
10 cottonwoods. The trees form a closed to open canopy with a variable understory on deep, well-

Table 3.4-2. Amount (Acres) of Each Land Cover Type By Reach

<i>Land Cover Type</i>	<i>Reach 1</i>	<i>Reach 2</i>	<i>Reach 3</i>	<i>Reach 4</i>	<i>Reach 5</i>	<i>Reach 6</i>	<i>Reach 7</i>	<i>Total</i>
Woody Riparian								
Cottonwood-willow	1,721	1	1,541	889	616	1,325	675	6,768
Saltcedar	2,254	838	13,647	26,923	5,581	6,257	2,800	58,300
Honey mesquite	0	4	627	6,443	175	5	0	7,253
Saltcedar-honey mesquite	58	359	3,463	13,398	778	234	2	18,293
Saltcedar-screwbean mesquite	0	32	5,058	4,654	579	786	49	11,159
Arrowweed	0	0	496	6,541	48	1,069	48	8,201
Atriplex	0	0	19	582	0	177	121	899
Marsh	137	22	4,358	2,091	3,762	1,414	129	11,914
Aquatic								
River	2,486	27,345	20,753	7,464	4,089	887	140	63,164
Reservoir	154,091	13	2,992	680	544	615	9	158,944
Backwater	NA	NA	7,841	3,427	4,994	1,510*	NA	17,772
Desert scrub	353	31	7,676	11,710	397	3,151	129	23,447
Agriculture	0	0	19,166	169,664	260	36,799	44,705	270,594
Developed	1	0	6,391	32,722	0	10,205	14,307	63,626
Other riparian**	0	0	6,634	6,268	0	2,337	13	15,252
TOTAL	161,100	28,645	100,661	293,456	21,825	66,772	63,127	735,586
NA = Not Available								
*Not all of Reach 6 was surveyed								
**Riparian cover types from LCR Accounting System database that do not fit into LCR MSCP land cover types as described								

watered, loamy alluvial soils on floodplains of the Colorado River and its major tributaries (Holland 1986). This plant community requires periodic winter or spring flooding to create new silt beds for cottonwood and willow seed germination, and the dominant trees do not tolerate permanent inundation (Ohmart et al. 1988, Brown 1994). As a result of flow stabilization, stands of the cottonwood-willow community remaining along the Colorado River are primarily decadent and show little evidence of seedling recruitment (Brown 1994).

Saltcedar

Several species of the genus *Tamarix* make up this community (*T. chinensis*, *T. parviflora*, *T. ramosissima*, and *T. aphylla*). All are non-native and have aggressively displaced native riparian vegetation along the river, particularly in saline areas where native vegetation has been cleared or removed by fire (Brown 1994, Turner and Karpiscak 1980, Ohmart et al. 1988). Saltcedar generally occurs as a monoculture because it promotes conditions that it tolerates better than the native species. It grows on sandy or gravelly soils and produces a large number of very small seeds, from March through October, that are dispersed long distances by wind and water (DeLoach et al. 2000, Lovich 2000). Stabilized low flows and regular summer flooding of river bars provide ideal conditions for establishment of saltcedar (Turner and Karpiscak 1980). It also takes up and excretes salts that increase soil salinity, and it increases fire frequency by producing large amounts of litter (DeLoach et al. 2000).

Honey Mesquite

Honey mesquite (*Prosopis glandulosa* var. *torreyana*) often forms monotypic stands of trees less than 30 feet tall, and it also grows mixed with other shrubby species. The canopy can be open or continuous, and the understory is usually of sparse shrubs or of grasses. This species does not tolerate prolonged inundation during the growing season and historically grew on secondary and higher terraces on the floodplain. Conversion of these terraces to agriculture decimated the populations in those areas. Regulation of the river, however, allowed the species to colonize areas closer to the river where it is vulnerable to replacement by saltcedar after flooding, fire, and vegetation clearing because it does not colonize open areas as rapidly as saltcedar (Minckley and Brown 1982; Ohmart et al. 1988). Honey mesquite is a facultative wetland plant (equal chance of being in upland or wetland plant communities) and has a long taproot to reach deep water tables (Reed 1988; Ohmart et al. 1988).

Saltcedar-Honey Mesquite

Honey mesquite comprises 10 to 40 percent of the trees in this community (Younker and Andersen 1986), which forms as saltcedar becomes well established in openings within a mesquite stand. Saltcedar gradually replaces honey mesquite, particularly after fires and floods, and as soil salinity increases (Ohmart et al. 1988).

Saltcedar-Screwbean Mesquite

Screwbean mesquite (*Prosopis pubescens*) is always found in association with saltcedar in the planning area and reflects the expansion of saltcedar with its displacement of screwbean mesquite (Ohmart et al. 1988; DeLoach et al. 2000). Historically, this species was fairly scarce

along the LCR, but it increased in abundance downstream from Parker Dam after that dam was completed due to stabilized summer low flows and reduced spring flooding (Ohmart et al. 1988). The subsequent expansion of agriculture on tribal lands reduced its abundance, and this decline has continued due to replacement by saltcedar.

Arrowweed

Arrowweed (*Pluchea sericea*) occurs along drier portions of the river floodplain, along canyon bottoms and irrigation ditches, around springs, and in sandy or gravelly washes (Ohmart et al. 1988, Holland 1986, Brown 1994, Sawyer and Keeler-Wolf 1995). It reproduces by seed and can spread vegetatively. Once established, it spreads laterally by rhizomes to form continuous stands. The species can recolonize open alluvial deposits by resprouting from roots and buried stems (Stromberg 1993). It has replaced cottonwood-willow vegetation in some areas because it tolerates higher soil salinities and can survive with greater groundwater depths (Holland 1986; Ohmart et al. 1988; Busch and Smith 1995) although it is being replaced by saltcedar in other areas (Turner and Karpiscak 1980).

Atriplex

Several species of saltbush (*Atriplex lentiformis*, *A. canescens*, *A. polycarpa*) form this community that occurs in saline areas along the LCR, often between stands of cottonwood-willow or saltcedar and stands of mesquite (Ohmart et al. 1988; Brown 1994; Younker and Andersen 1986). Quailbush (*A. lentiformis*) is the primary species in the community along the river, while the other species are more commonly found in the desert scrub community.

MARSH

Marshes occur in areas characterized by long-term flooding such as oxbow lakes, backwaters, and around reservoirs with minimal daily and annual fluctuations in water level (Ohmart et al. 1988; Brown 1994). The dominant species are cattails (*Typha* spp.), bulrush (*Scirpus* spp.), and common reed (*Phragmites australis*) (Ohmart et al. 1988). Cattails grow in shallow water up to 3 feet deep while bulrushes can grow in water to a depth of 5 feet. Common reed forms dense stands along the banks (Ohmart et al. 1988; Brown 1994). At the upper elevation limit of marshes, the plants can intergrade with riparian scrub species (Brown 1994). Marshes can include open water, as well as sandbars and mudflats when the water level is low (Salas et al. 1996).

OTHER

The river land cover type includes marshes in shallow waters and can include riparian vegetation when these areas are inundated by high water. Marshes can also be part of backwaters. Desert scrub comprises several plant communities that occur adjacent to the floodplain and river channel along with agriculture and development. Agricultural fields are dominated by various crops, while fallow fields support primarily weedy species. A variety of landscape species are used in developed areas.

1 Fish and Wildlife

2 The LCR supports several hundred species of wildlife (birds, mammals, fish, reptiles, and
3 amphibians), including both resident species and migratory visitors, that use the land cover
4 types described above. Woody riparian vegetation and upland land cover types such as desert
5 scrub and, to some extent, agriculture provide habitat for common mammals such as mule deer
6 (*Odocoileus hemionus*), burro (*Equus asinus*) (a non-native mammal), coyote (*Canis latrans*), bobcat
7 (*Felis rufus*), Audubon cottontail (*Sylvilagus audubonii*), several species of rodents and bats,
8 striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*) (Anderson and Ohmart 1984b).
9 Reptiles and amphibians are represented by several species of lizards, snakes, toads, and frogs,
10 many of which are native to the area. Most of these use upland and riparian areas, but the
11 amphibians require water for reproduction. The spiny soft-shelled turtle (*Trionyx spiniferus*) has
12 also been introduced and is present in Lake Mead and Lake Mohave (Allan and Roden 1978). A
13 variety of aquatic invertebrates inhabit the reservoirs and river. Fourteen species of
14 zooplankton have been reported in Lake Mead and Lake Mohave as well as mollusks,
15 crustaceans, aquatic and terrestrial insects, and a freshwater jellyfish (Allan and Roden 1978).

16 Historically, the Colorado River in the planning area was inhabited by eight native fish species.
17 Four of these native species are marine or brackish water species that probably never got much
18 farther upstream than the Imperial Dam area: spotted sleeper (*Eleotris picta*), machete (*Elops*
19 *affinis*), longjaw mudsucker (*Gillichthys mirabilis*), and striped mullet (*Mugil cephalus*). Of the
20 other four species (Colorado pikeminnow [*Ptychocheilus lucius*], razorback sucker [*Xyrauchen*
21 *texanus*], bonytail [*Gila elegans*], and desert pupfish [*Cyprinodon macularius*]), only the bonytail
22 and razorback sucker are still present. At least 23 non-native fish species have been introduced
23 into the LCR in California (Moyle 2002). These include threadfin shad (*Dorosoma petenense*), five
24 species of minnow, four species of catfish, mosquitofish (*Gambusia affinis*), striped bass (*Morone*
25 *saxatilis*), six species of centrarchids (bass and sunfish), and four species of cichlids. Most of
26 these species plus several species of trout and salmon have been stocked in Lake Mead and
27 Lake Mohave (Allan and Roden 1978). The Lake Mead fish hatchery and the Willow Beach
28 hatchery (on Lake Mohave) supply rainbow trout (*Oncorhynchus mykiss*) for stocking into the
29 LCR.

30 The Colorado River corridor provides important habitat for migratory birds, both upland
31 species and waterfowl, as well as habitat for resident species. Woody riparian vegetation and
32 wetlands provide habitat for a variety of raptors that include sharp-shinned hawk (*Accipiter*
33 *striatus*), Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), red-tailed hawk
34 (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus johannis*), common black hawk (*Buteogallus*
35 *anthracinus*), Harris' hawk (*Parabuteo unicinctus*), bald eagle (*Haliaeetus luecocephalus*), golden
36 eagle (*Aquila chrysaetos*), white-tailed kite (*Elanus leucurus*), American kestrel (*Falco sparverius*),
37 and peregrine falcon (*Falco peregrinus*). Other common birds include egrets, herons, flycatchers,
38 and woodpeckers. Backwaters and reservoirs provide resting and foraging habitat for
39 waterfowl and shorebirds.

40 Sensitive Species

41 Sensitive species, for the purposes of the Conservation Plan, are defined as special-status
42 species that meet one or more of the following criteria:

- animal species listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.11 [listed animals], and various notices in the Federal Register [proposed species]);
- animal species that are candidates for possible future listing as threatened or endangered under the ESA (61 FR 40: 7596-7613, February 28, 1996);
- wildlife species of special concern to AGFD;
- plants listed as rare under the California Native Plant Protection Act;
- plants included on California Native Plant Society (CNPS) List 1A, 1B, 2, or 3;
- animal species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5);
- animal species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines, section 15380);
- animal species of special concern to CDFG (Remsen 1978 [birds], Williams 1986 [mammals], and Jennings and Hayes 1994 [amphibians and reptiles]);
- animals fully protected in California (California Fish and Game Code, section 3511 [birds], section 4700 [mammals], section 5050 [reptiles and amphibians], and section 5515 [fish]);
- animal species included in CDFG's list of Special Animals and monitored by the California Natural Diversity Database (CNDDDB);
- animal and plant species that are protected under State of Nevada Administrative Code (503.030); and
- BLM and Service designated sensitive species.

Covered and Evaluation Species

A number of species that are Federally listed as threatened or endangered are known or have the potential to occur along the LCR, and six of these are included in the proposed Conservation Plan. All of these are also listed by one or more states along the river. In addition, the Conservation Plan includes six species that are state-listed but not Federally listed; 13 species that are designated as species of special concern in one or more states; and two species that have no current regulatory status but could become listed over the 50-year life of the Conservation Plan. Four other species are included in the Conservation Plan as "evaluation species" that could be proposed for coverage under the section 10(a)(1)(B) permit in the future. Table 3.4-3 lists the species proposed for coverage in the Conservation Plan and their regulatory status with brief notes about the species. More detailed information is provided in the LCR MSCP BA and is summarized in Appendix I.

Other Sensitive Species

Additional species are considered sensitive and have special status, are known or suspected to have occurred in the planning area, and are not covered under the Conservation Plan. These species are not covered under the Conservation Plan because covered activities would not affect

Table 3.4-3. Covered and Evaluation Species for the Conservation Plan

Common and Scientific Name	Federal Status ¹	Arizona Status ²	California Status ³	Nevada Status ⁴	Covered Species ⁵	Notes ⁶
MAMMALS						
California leaf-nosed bat <i>Macrotus californicus</i>	-	ASC	CSC	-	E	Roost in caves/ mines, forages near open water
Pale Townsend's big-eared bat <i>Corynorhinus townsendii pallascens</i>	-	-	CSC	-	E	Roost in caves or structures, forages over desert scrub, riparian vegetation, or open water
Western red bat <i>Lasiurus blossevillei</i>	-	ASC	-	-	C	Roost in riparian trees
Western yellow bat <i>Lasiurus xanthinus</i>	-	ASC	-	-	C	Roost in palms or riparian trees, forages over canopy
Desert pocket mouse <i>Chaetodipus penicillatus sobrinus</i>	-	-	-	-	C	Endemic to R1-2, sand in riparian/mixed desert scrub
Colorado River cotton rat <i>Sigmodon arizonae plenus</i>	-	-	CSC	-	C	R3-4 in mesic herbaceous vegetation
Yuma hispid cotton rat <i>Sigmodon hispidus eremicus</i>	-	-	CSC	-	C	Moist grassy areas or brushy areas along river
BIRDS						
Western least bittern <i>Ixobrychus exilis hesperis</i>	-	ASC	CSC	-	C	Cattail & bulrush marshes, summer resident & breeder
Yuma clapper rail <i>Rallus longirostris yumanensis</i>	FE	ASC	CT/FP	-	C	R1, 3-7 in marshes with water <12"
California black rail <i>Laterallus jamaicensis coturniculus</i>	-	ASC	CT/FP	-	C	Bulrush marsh with shallow water
Yellow-billed cuckoo <i>Coccyzus americanus</i>	FC	ASC	CE	-	C	R3-5 in mature CW forest
Elf owl <i>Micrathene whitneyi</i>	-	-	CE	NP	C	R3-4 in CW or mesquite with large snags
Gilded flicker <i>Colaptes chrysoides</i>	-	-	CE	-	C	Primarily at Bill Williams Delta in CW with saguaro nearby
Gila woodpecker <i>Melanerpes uropygialis</i>	-	-	CE	-	C	R3-6 in tall trees; nest in snags
Southwestern willow flycatcher <i>Empidonax trailii extimus</i>	FE	ASC	CE	-	C	Dense riparian vegetation close to ground with water or moist soil
Vermilion flycatcher <i>Pyrocephalus rubinus</i>	-	-	CSC	-	C	CW with mesquite, open water and pasture nearby

Table 3.4-3. Covered and Evaluation Species for the Conservation Plan (continued)

<i>Common and Scientific Name</i>	<i>Federal Status¹</i>	<i>Arizona Status²</i>	<i>California Status³</i>	<i>Nevada Status⁴</i>	<i>Covered Species⁵</i>	<i>Notes⁶</i>
Arizona Bell's vireo <i>Vireo bellii arizonae</i>	-	-	CE	-	C	CW and mesquite; forage in dense riparian vegetation
Sonoran yellow warbler <i>Dendroica petechia sonorana</i>	-	-	CSC	-	C	Nest in wet deciduous thickets of saltcedar or CW
Summer tanager <i>Piranga rubra</i>	-	-	CSC	-	C	Nest in CW or saltcedar; forage in top of trees
REPTILES						
Desert tortoise (Mojave population) <i>Gopherus agassizii</i>	FT	ASC	CT	NT	C	R1-6 in desert scrub with creosote bush; burrows; critical habitat in R1-4
Flat-tailed horned lizard <i>Phrynosoma mcalli</i>	-	ASC	CSC	-	C	R6-7 in fine sand in sparse desert scrub
AMPHIBIANS						
Colorado River toad <i>Bufo alvarius</i>	-	-	CSC	-	E	Requires water for breeding; uses burrows Aug-Feb
Relict leopard frog <i>Rana onca</i>	FC	ASC	-	NP	C	R1-2 in Lake Mead NRA; shallow water with emergent vegetation & adjacent CW with moist soil
Lowland leopard frog <i>Rana yavapaiensis</i>	-	ASC	CSC	-	E	Bill Williams River NWR in flowing water with aquatic vegetation & adjacent CW with moist soil
FISH						
Bonytail <i>Gila elegans</i>	FE	ASC	CE	NE	C	R2-3; critical habitat in planning area; population not self-sustaining
Humpback chub <i>Gila cypha</i>	FE	ASC	-	-	C	Not currently in planning area
Flannelmouth sucker <i>Catostomus latipinnis</i>	-	ASC	-	-	C	R3 in main channel; juveniles use backwaters
Razorback sucker <i>Xyrauchen texanus</i>	FE	ASC	CE/FP	NE	C	R1-5; critical habitat in planning area; population not self-sustaining

Table 3.4-3. Covered and Evaluation Species for the Conservation Plan (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	California Status ³	Nevada Status ⁴	Covered Species ⁵	Notes ⁶
INVERTEBRATES						
MacNeill's sootywing skipper <i>Pholisora graciellae</i>	-	-	-	-	C	R1-3 & below Parker Dam in R4; interface of quailbush & honey mesquite with high groundwater
PLANTS						
Sticky buckwheat <i>Eriogonum viscidulum</i>	-	-	-	NEP	C	R1-2 in Mohave mixed scrub in deep sands with seasonally moist soil
Threecorner milkvetch <i>Astragalus geyeri</i> var. <i>triquetrus</i>	-	-	-	NEP	C	R1-2 in creosote bush scrub with stabilized sandy soil
Notes: 1 Federal Status FE= Listed as endangered under the ESA. FT= Listed as threatened under ESA. FC= Candidate for listing under ESA. 2 Arizona Status ASC = Arizona wildlife of special concern. 3 California Status CE = Listed as endangered under CESA. CT = Listed as threatened under CESA. CSC = California species of special concern. FP = Fully protected under the California Fish and Game Code. 4 Nevada Status NE = Nevada endangered NT = Nevada threatened. NEP = Nevada critically endangered plant. NP = Nevada protected. 5 C = Conservation Plan covered species. E = Conservation Plan evaluation species. 6 R = Reach. CW = Cottonwood-willow.						

(result in take of) the Federally listed species or because the species are not anticipated to become Federally listed over the life of the proposed action. These species, however, are included in the impact analysis because actions that are part of the Conservation Plan could adversely affect one or more of these species, and such impacts must be addressed under CEQA and NEPA. The status of these sensitive species and the primary habitats or plant communities where they generally are found are presented in Table 3.4-4, and additional information is provided in Appendix D. These sensitive species include a number of bats, Yuma puma, piscivorous (fish-eating) birds, wading birds, waterfowl, raptors, riparian-dependent song birds, several bird species associated with agriculture and grasslands, other upland and water-associated birds, two species of toad, the banded Gila monster and rosy boa, two invertebrates, and one plant.

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area

Common and Scientific Name	Federal Status ¹	Arizona Status ²	California Status ³	Nevada Status ⁴	Notes ⁵
MAMMALS					
Mexican long-tongued bat <i>Choeronycteris mexicana</i>	-	-	CSC	-	Northern limit of range just over U.S./Mexico border; migratory with adult females into U.S.
Occult little brown bat <i>Myotis lucifugus occultus</i>	-	-	CSC	-	Roost in tree cavities, under rocks/wood, or in structures; forage along shorelines
Small-footed myotis <i>Myotis ciliolabrum</i>	-	-		-	Roost in trees, bridges, rocks; occur in CW, pinyon-juniper, chaparral
Fringed myotis <i>Myotis thysanodes</i>	-	-		-	Roost and breed in caves, mines, buildings; occur in oak woodland near water
Cave myotis <i>Myotis velifer</i>	-	-	CSC	-	Forage in linear stands of mesquite, saltcedar, or acacia along still water
Yuma myotis <i>Myotis yumanensis</i>	-	-	CSC	-	Roost in buildings; prefer cliffs/rock walls near open woodland or scrub; forage over water
Spotted bat (<i>Euderma maculatum</i>)	-	ASC	CSC	NT	In montane, riparian, & scrub vegetation; forage on moths
Allen's big-eared bat <i>Indionycteris (=Plecotus) phyllotis</i>	-	-		-	At higher elevations (e.g., Mogollon Rim); forage near water
Pallid bat <i>Antrozous pallidus</i>	-	-	CSC	-	Primarily in desert scrub; roost in rocks, hollow trees, buildings etc.
Pocketed freetail bat <i>Nyctinomops femorosaccus</i>	-	-	CSC	-	Roost in buildings, caves, crevices in semi-arid desert; forage on insects
Big freetail bat <i>Nyctinomops macrotis</i>	-	-	CSC	-	Roost in rocky areas of desert scrub; forage on insects
Greater western mastiff bat <i>Eumops perotis californicus</i>	-	-	CSC	-	Prefer rugged rocky areas in desert scrub; forage on insects & require water
Yuma puma <i>Felis concolor browni</i>	-	ASC	CSC	-	Requires open water, rocky shelters; prey on medium to large mammals
BIRDS					
Clark's grebe <i>Aechmophorus clarkii</i>	-	ASC	-	-	Common year-round; breeds in open marshes; forages/rests in open water in reservoirs
California brown pelican <i>Pelecanus occidentalis</i>	FE	-	CE/FP	NP	Rare late summer/fall; forages in open water in reservoirs; rests on sandbars
American white pelican <i>Pelecanus erythrorhynchos</i>	-	-	CSC	NP	Uncommon migrant; forages in open water in reservoirs; rests on sandbars

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

<i>Common and Scientific Name</i>	<i>Federal Status¹</i>	<i>Arizona Status²</i>	<i>California Status³</i>	<i>Nevada Status⁴</i>	<i>Notes⁵</i>
Double-crested cormorant <i>Phalacrocorax auritus</i>	-	-	CSC ⁶	-	Common year-round; forages in open water in reservoirs; rests on sandbars and perches in trees; breeds on large trees
American bittern <i>Botaurus lentiginosus</i>	-	ASC	-	-	Uncommon, winter; forages in dense marshes
Great blue heron <i>Ardea herodias</i>	-	-	-	-	Common year-round; forages in marshes & shallow waters, and in agricultural fields & irrigation ditches
Great egret <i>Ardea alba</i>	-	ASC	-	-	Common year-round; forages in marshes & shallow waters, and in agricultural fields & irrigation ditches
Snowy egret <i>Egretta thula</i>	-	ASC	-	-	Common year-round; forages in marshes & shallow waters, and in agricultural fields & irrigation ditches
Black-crowned night-heron <i>Nycticorax nycticorax</i>	-	-	-	-	Common year-round; forages in marshes & shallow waters, and in agricultural fields & irrigation ditches
White-faced ibis <i>Plegadis chihi</i>	-	-	CSC ⁶	NP	Common year-round; forages and breeds in marshes, also forages in agricultural fields
Wood stork <i>Mycteria americana</i>	-	-	CSC	-	Casual post-breeding visitor; forages along river banks and backwaters
Turkey vulture <i>Cathartes aura</i>	-	-	-	NP	Common year-round; forages throughout; nests primarily on cliff faces, and perhaps in CW
Fulvous whistling-duck <i>Dendrocygna bicolor</i>	-	-	CSC	-	Casual post-breeding visitor; forages in marshes
Redhead <i>Aythya americana</i>	-	-	CSC	-	Uncommon, winter; forages in marshes and open water
Osprey <i>Pandion haliaetus</i>	-	ASC	-	NP	Uncommon migrant; forages in open water; roosts in tall trees
Bald eagle <i>Haliaeetus leucocephalus</i>	FT	ASC	CE/FP	NE	Rare, winter; forages in open water; roosts in tall trees
White-tailed kite <i>Elanus leucurus</i>	-	-	CSC	NP	Casual, winter; forages in agricultural fields; roosts in trees and shrubs
Northern harrier <i>Circus cyaneus</i>	-	-	CSC	NP	Common, winter; forages in agricultural fields & open riparian areas
Cooper's hawk <i>Accipiter cooperi</i>	-	-	CSC ⁶	NP	Common, winter; forages primarily in riparian woodlands
Harris' hawk <i>Parabuteo unicinctus</i>	-	-	CSC	NP	Casual, year-round; forages primarily in riparian woodlands & mesquite scrub

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	California Status ³	Nevada Status ⁴	Notes ⁵
Swainson's hawk <i>Buteo swainsoni</i>	-	-	CT	NP	Uncommon migrant; forages in agricultural fields & open riparian areas
Ferruginous hawk <i>Buteo regalis</i>	-	ASC	CSC ⁶	NP	Uncommon, winter; forages in agricultural fields
Golden eagle <i>Aquila chrysaetos</i>	-	-	FP	NP	Rare, winter; forages in agricultural fields and open riparian areas
American kestrel <i>Falco sparverius</i>	-	-	-	NP	Common year-round; forages in agricultural fields and riparian areas; breeds in cavities in large trees
Merlin <i>Falco columbarius</i>	-	-	CSC ⁶	NP	Uncommon, winter; forages in agricultural fields and open riparian areas; roosts in trees and on fences
Peregrine falcon <i>Falco peregrinus</i>	-	ASC	CE/FP	NE	Rare, winter; forages in agricultural fields and water areas on waterfowl
Prairie falcon <i>Falco mexicanus</i>	-	-	CSC	NP	Uncommon, winter; forages in agricultural fields & open riparian areas
Greater sandhill crane <i>Grus canadensis tabida</i>	-	-	CT/FP	-	Common, winter; forages in agricultural fields
Western snowy plover (interior population) <i>Charadrius alexandrinus nivosus</i>	FT	ASC	CSC	-	Rare migrant; forages in agricultural fields; also found in marshes
Mountain plover <i>Charadrius montanus</i>	-	-	CSC	-	Uncommon, winter; forages in agricultural fields
Long-billed curlew <i>Numenius americanus</i>	-	-	CSC ⁶	-	Common migrant; forages in agricultural fields
California gull <i>Larus californicus</i>	-	-	CSC ⁶	-	Common migrant; forages in agricultural fields; roosts in open water & on sandbars
Black tern <i>Chlidonias niger</i>	-	-	CSC	-	Uncommon migrant; forages in open water
Greater roadrunner <i>Geococcyx californianus</i>	-	-	-	NP	Common year-round; forages and breeds in open scrub
Long-eared owl <i>Asio otus</i>	-	-	CSC	NP	Rare year-round; forages in agricultural fields & open riparian; breeds in dense riparian woodland
Short-eared owl <i>Asio flammeus</i>	-	-	CSC	NP	Rare, winter; forages in agricultural fields and open riparian
Burrowing owl <i>Athene cunicularia</i>	-	-	CSC	NP	Common to uncommon, year-round in open areas (grassland, agriculture, desert) with existing burrows
Lesser nighthawk <i>Chordeiles acutipennis</i>	-	-	-	NP	Common, summer; forages over open water, agricultural fields and open riparian

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	California Status ³	Nevada Status ⁴	Notes ⁵
Vaux's swift <i>Chaetura vauxi</i>	-	-	CSC	-	Uncommon migrant; forages over open water, agricultural fields and open riparian
Belted kingfisher <i>Ceryle alcyon</i>	-	ASC	-	NP	Common, winter; forages in marshes and open water plus in irrigation ditches
Olive-sided flycatcher <i>Contopus cooperi</i>	-	-	CSC	-	Uncommon migrant; forages in mature CW woodland, parks, suburban areas, golf courses, and sometimes in mature honey mesquite
Ash-throated flycatcher <i>Myiarchus cinerascens</i>	-	-	-	-	Common year-round; forages and breeds in riparian areas/desert scrub
Brown-crested flycatcher <i>Myiarchus tyrannulus</i>	-	-	CSC ⁶	-	Rare, summer; forages and breeds in mature CW woodland, parks, suburban areas, golf courses, and sometimes in mature honey mesquite
Purple martin <i>Progne subis</i>	-	-	CSC	-	Rare migrant; forages over open water, agricultural fields and open riparian
Bank swallow <i>Riparia riparia</i>	-	-	CT	-	Uncommon migrant; forages over open water, agricultural fields and open riparian
Swainson's thrush <i>Catharus ustulatus</i>	-	-	CSC	-	Uncommon spring migrant; forages in CW woodland, parks, suburban areas, golf courses, & sometimes in honey mesquite
Bendire's thrasher <i>Toxostoma bendirei</i>	-	-	CSC	-	Rare, winter; forages in riparian & upland desert scrub
Crissal thrasher <i>Toxostoma crissale</i>	-	-	CSC	-	Common year-round; forages and breeds in riparian scrub
Loggerhead shrike <i>Lanius ludovicianus</i>	-	-	CSC	-	Common year-round; forages in agricultural fields and open riparian areas; breeds in trees and shrubs in agricultural, landscape, & riparian areas
Lucy's warbler <i>Vermivora luciae</i>	-	-	CSC	-	Common, summer; forages and breeds in mesquite & CW woodland
Yellow-breasted chat <i>Icteria virens</i>	-	-	CSC	-	Uncommon, summer; forages and breeds in mesquite & CW woodland
Northern cardinal <i>Cardinalis cardinalis</i>	-	-	CSC ⁶	-	Rare year-round; forages and breeds in riparian scrub and suburban areas
Abert's towhee <i>Pipilo aberti</i>	-	-	-	-	Common year-round; forages and breeds in riparian woodland and scrub, plus edges of agricultural fields

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	California Status ³	Nevada Status ⁴	Notes ⁵
Large-billed savannah sparrow <i>Passerculus sandwichensis rostratus</i>	-	-	CSC	-	Rare, winter; forages in open scrub and perhaps in agricultural fields
Sage sparrow <i>Aimophila belli</i>	-	-	CSC	-	Uncommon, winter; forages in inkweed/open mesquite scrub
Grasshopper sparrow <i>Ammodramus savannarum</i>	-	-	CSC	-	Rare, winter; forages in agricultural fields
Yellow-headed blackbird <i>Xanthocephalus xanthocephalus</i>	-	-	CSC	-	Common year-round; breeds and forages in marshes, also forages in agricultural fields
Lawrence's goldfinch <i>Carduelis lawrencei</i>	-	-	CSC	-	Variable, winter; forages in mesquite, riparian scrub, and edges of agricultural fields
REPTILES					
Banded Gila monster <i>Heloderma suspectum cinctum</i>	-	-	CSC	NP	In a variety of plant communities, desert to riparian; use animal burrows or crevices for shelter
Desert rosy boa <i>Lichanura trivirgata gracia</i>	-	-	CSC ⁶	-	In rocky shrubland and desert; attracted to intermittent and permanent water
AMPHIBIANS					
Arizona toad <i>Bufo microscaphus microscaphus</i>	-	-	-	-	In rocky streams and washes; eggs laid in pools
Couch's spadefoot toad <i>Scaphiopus couchii</i>	-	-	CSC	-	Breeds in rain pools lasting at least 7 days; dormant in burrows much of year
INVERTEBRATES					
Maricopa tiger beetle <i>Cicindela oregona maricopa</i>	-	-	-	-	Often on sandy stream banks; burrow
Obsolete Viceroy butterfly <i>Limenitis archippus obsoleta</i>	-	-	-	-	Willow is host plant; feed on tree sap, dung, flower nectar
PLANTS					
Mud nama <i>Nama stenocarpum</i>	-	-	-	-	Intermittent wet areas (mud flats, lake shores, river banks)

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

<i>Common and Scientific Name</i>	<i>Federal Status¹</i>	<i>Arizona Status²</i>	<i>California Status³</i>	<i>Nevada Status⁴</i>	<i>Notes⁵</i>
<p>Notes:</p> <p>1 Federal Status FE = Listed as endangered under the ESA. FT = Listed as threatened under ESA. FP = Proposed for listing as threatened under ESA. FC = Candidate for listing under ESA.</p> <p>2 Arizona Status ASC = Arizona wildlife of special concern.</p> <p>3 California Status CE = Listed as endangered under CESA. CT = Listed as threatened under CESA. FP = Fully protected under the California Fish and Game Code. CSC = California species of special concern.</p> <p>4 Nevada Status NE = Nevada endangered NT = Nevada threatened. NEP = Nevada critically endangered plant. NP = Nevada protected.</p> <p>5 CW = Cottonwood-willow</p> <p>6 Under review by CDFG for removal from the current list of California Species of Special Concern.</p>					

The CNDDDB identifies the following sensitive plant communities in the planning area: Sonoran Cottonwood-Willow Riparian Forest, Mesquite Woodland, and Alkali Bulrush-Cattail Marsh and Brackish Bulrush-Cattail Marsh.

3.4.1.2 Muddy River/Moapa Valley and Virgin River

Both the Muddy River and Virgin River are tributaries to Lake Mead and are not in the planning area. The Virgin River is a perennial stream that originates in the plateaus of southern Utah above Zion National Park. It flows through the park and southwesterly in the Virgin River Canyon, between the Virgin and Mormon mountains. Strong seasonal flows are associated with spring snowmelt and flash floods during summer thunderstorms (BIO/WEST 2001). Although the Virgin River upstream of Lake Mead is a largely intact riparian ecosystem, its plant and animal communities are strongly affected by non-native invasive species.

The headwaters of the Muddy River are formed by the outflows of numerous hot springs that discharge in the vicinity of Warm Springs and support a unique ecosystem that includes several endemic species. Downstream, the Muddy River flows through agricultural lands of the Moapa Valley and is heavily altered by flood control structures, channels, and canals.

Vegetation

A detailed evaluation of the lower Virgin River riparian corridor, extending upstream from Lake Mead to about 4 miles above Littlefield, Arizona and covering 11,132 acres, completely overlapping and extending upstream beyond the area considered as part of this alternative, was conducted by CH2MHill for Reclamation (1999). The mapping of vegetation communities and open water/river channel was based on 1997 surveys. Totals for the study area as a whole are as follows:

- Saltcedar (8,612 acres), by far the dominant vegetation of this off-site conservation area, in four structural types (III-VI).
- Saltcedar-Honey Mesquite (264 acres), dominated by tamarisk but including honey mesquite.
- Arrowweed (95 acres), as mapped along the LCR and occurring throughout the riparian corridor on sandy sites or in old channels.
- Honey Mesquite (92 acres) and Screwbean Mesquite (48 acres), occurring in small pockets on the edges of the riparian corridor.
- Cottonwood-Willow (729 acres), dominated by willow and cottonwood trees in five structural types (I-V). An additional 20 acres were identified as Cottonwood Regeneration Areas based on recent recruitment and presence of young cottonwoods in otherwise open areas.
- Marsh (412 acres), dominated by herbaceous wetland plants.
- Open Water/River Channel (758 acres), consisting of the river channel, including bars and adjacent ponds and reservoirs. An additional 1,144 acres consists of unvegetated alluvium subject to heavy scouring or deposition during the study.
- Agriculture (101 acres) crops, and fallow fields.

Similar to the earlier, more generalized mapping done by Ohmart (USBR 1982a), the numbers indicate the riparian corridor is strongly dominated by saltcedar. This would provide the opportunity to expand native riparian vegetation acreage in this region by removing/converting saltcedar. The relatively natural floodplain of the Virgin River also provides substantial opportunity for reestablishing backwater and marsh habitats.

The area considered for off-site conservation along the Muddy River/Moapa Valley riparian corridor extends upstream from the Overton arm of Lake Mead to the headwaters of the Muddy River at Warm Springs, Nevada, the location of the Moapa NWR, which is part of the larger Desert NWR. The Warm Springs area is remarkable for the discharge of numerous hot springs that provide a unique and effectively isolated habitat for several species of endemic fishes (see Fish and Wildlife below). At the refuge and extending downstream, a non-native palm woodland of California fan palms (*Washingtonia filifera*) and date palms (*Phoenix dactylifera*) is prevalent alongside the stream, intermixed with marsh vegetation and pools of open water. Native mesquite and saltbush vegetation exists but is of limited extent (e.g., see <http://desertcomplex.fws.gov/>). Farther downstream, the riparian corridor is dominated by saltcedar, with surrounding lands a mix of agriculture and desert scrub vegetation (Scoppettone et al. 1998). The palms and saltcedar promote fires and encroach upon the streambed and pools, jeopardizing the native fishes (Scoppettone et al. 1998).

Fish and Wildlife

Native fishes of the lower Virgin River downstream of the Riverside Bridge and within the off-site conservation area include the desert sucker (*Catostomus clarki*) and speckled dace (*Rhinichthys osculus*) (BIO/WEST 1999). Woundfin (*Plagopterus argentissimus*) and Virgin River chub (*Gila seminuda*) are also present (see sensitive species below), and critical habitat for both

of these species is present in this area. Non-native fishes inhabiting this reach of the river include red shiner (*Cyprinella lutrensis*), common carp (*Cyprinus carpio*), and mosquitofish, among others (USBR 1982a).

The Muddy River/Moapa Valley area provides limited woody riparian vegetation that is dominated by saltcedar. Critical aquatic habitat for endemic fishes exists in the headwaters at Warm Springs and downstream (USFWS 1995; Scopettone et al. 1998). Native fishes of the Muddy River include the Moapa speckled dace (*Rhinichthys osculus moapae*), Moapa White River springfish (*Crenichthys baileyi moapae*), and Muddy River roundtail chub (*Gila seminuda*). A large number of non-native fish species are present, predominantly downstream of the Warm Springs area and continuing into Lake Mead (see USFWS 1995). Non-native species that co-occur with native fishes in spring-fed pools include shortfin mollies (*Poecilia mexicana*), mosquitofish, and tilapia (*Oreochromis aureus*) (Scopettone et al. 1998).

As part of the BIO/WEST (2001) study, wildlife surveys were conducted over a 3-year period in all the major vegetation types. A total of 233 wildlife species were observed. The greatest number of species (140) were associated with the open water/river channel area. Although amounting to a small percentage of the total area surveyed, more than half (121) of the total number of species observed were in riparian forest, and about 18 percent (43) of the total were almost exclusively associated with that vegetation type. Emergent wetlands and springs are of very limited extent along the river but provide nesting habitat for many species. Saltcedar-dominated, mixed (saltcedar plus natives) shrublands, and willow-dominated riparian scrub all were found to support moderate wildlife diversity. A detailed breakdown of species' occurrences by vegetation type is provided by BIO/WEST (2001).

Sensitive Species

Sensitive species, including covered and evaluation species, that are present or could be present in each of the off-site conservation areas are listed in Table 3.4-5.

COVERED AND EVALUATION SPECIES

Of the 31 covered and evaluation species, 19 are present or could be present within the Virgin and Muddy rivers off-site conservation area (Table 3.4-5) and would benefit from habitat establishment and subsequent management actions on a combination of public and private lands. The Virgin River supports the largest concentration of southwestern willow flycatchers (40 known territories) in the LCR recovery unit and is one of the key areas targeted for recovery of the species, with a goal of 100 territories (USFWS 2002d). In addition, the flannelmouth sucker occurs in the Virgin and Muddy rivers.

OTHER SENSITIVE SPECIES

A total of 65 additional sensitive species that are or could be present in or near this off-site conservation area are listed in Table 3.4-5. Sensitive fish species that could be present in or adjacent to this off-site conservation area that are not present in the planning area described above are the Moapa dace (*Moapa coriacea*), Virgin river spinedace (*Lepidomeda mollispinis*), woundfin (*Plagopterus argentisimus*), and Virgin River chub (*Gila seminuda*). Other potentially

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas

Common and Scientific Name	Federal Status ¹	Arizona Status ²	Nevada Status ³	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	Lower Bill Williams River	Lower Gila River
MAMMALS						
California leaf-nosed bat ⁴ <i>Macrotus californicus</i>	-	ASC	-	X	X	X
Pale Townsend's big-eared bat ⁴ <i>Corynorhinus townsendii pallescens</i>	-	-	-	X	X	X
Western red bat ⁵ <i>Lasiurus blossevillii</i>	-	ASC	-	X	X	X
Western yellow bat ⁵ <i>Lasiurus xanthinus</i>	-	ASC	-	X	X	X
Mexican long-tongued bat <i>Choeronycteris mexicana</i>	-	-	-		X	X
Occult little brown bat <i>Myotis lucifugus occultus</i>	-	-	-	X	X	X
Small-footed myotis <i>Myotis ciliolabrum</i>	-	-	-	X	X	X
Fringed myotis <i>Myotis thysanodes</i>	-	-	-	X	X	X
Cave myotis <i>Myotis velifer</i>	-	-	-	X	X	X
Yuma myotis <i>Myotis yumanensis</i>	-	-	-	X	X	X
Spotted bat <i>Euderma maculatum</i>	-	ASC	NT	X	X	X
Allen's big-eared bat <i>Indionycteris (=Plecotus) phyllotis</i>	-	-	-	X	X	X
Pallid bat <i>Antrozous pallidus</i>	-	-	-	X	X	X
Pocketed freetail bat <i>Nyctinomops femorosaccus</i>	-	-	-		X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	Nevada Status ³	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	Lower Bill Williams River	Lower Gila River
MAMMALS						
Big freetail bat <i>Nyctinomops macrotis</i>	-	-	-	X	X	X
Greater western mastiff bat <i>Eumops perotis californicus</i>	-	-	-	X	X	X
Desert pocket mouse ⁵ <i>Chaetodipus penicillatus sobrinus</i>	-	-	-	X		
Yuma hispid cotton rat ⁵ <i>Sigmodon hispidus eremicus</i>	-	-	-			X
Yuma puma <i>Felis concolor browni</i>	-	ASC	-		X	X
BIRDS						
Double-crested cormorant <i>Phalacrocorax auritus</i>	-	-	-		X	
American bittern <i>Botaurus lentiginosus</i>	-	ASC	-		X	
Western least bittern ⁵ <i>Ixobrychus exilis hesperis</i>	-	ASC	-	X	X	X
Great blue heron <i>Ardea herodias</i>	-	-	-	X	X	X
Great egret <i>Ardea alba</i>	-	ASC	-	X	X	X
Snowy egret <i>Egretta thula</i>	-	ASC	-	X	X	X
Black-crowned night-heron <i>Nycticorax nycticorax</i>	-	-	-	X	X	X
White-faced ibis <i>Plegadis chihi</i>	-	-	NP		X	

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	Nevada Status ³	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	Lower Bill Williams River	Lower Gila River
BIRDS						
Turkey vulture <i>Cathartes aura</i>	-	-	NP	X	X	X
Osprey <i>Pandion haliaetus</i>	-	ASC	NP	X	X	X
Bald eagle <i>Haliaeetus leucocephalus</i>	FT	ASC	NE	X	X	X
White-tailed kite <i>Elanus leucurus</i>	-	-	NP	X	X	X
Northern harrier <i>Circus cyaneus</i>	-	-	NP	X	X	X
Cooper's hawk <i>Accipiter cooperi</i>	-	-	NP	X	X	X
Harris' hawk <i>Laterallus jamaicensis coturniculus</i>	-	-	NP	X	X	X
Swainson's hawk <i>Buteo swainsoni</i>	-	-	NP	X	X	X
Ferruginous hawk <i>Buteo regalis</i>	-	ASC	NP	X	X	X
Golden eagle <i>Aquila chrysaetos</i>	-	-	NP	X	X	X
American kestrel <i>Falco sparverius</i>	-	-	NP	X	X	X
Merlin <i>Falco columbarius</i>	-	-	NP	X	X	X
Peregrine falcon <i>Falco peregrinus</i>	-	ASC	NE	X	X	X
Prairie falcon <i>Falco mexicanus</i>	-	-	NP	X	X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	Nevada Status ³	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	Lower Bill Williams River	Lower Gila River
BIRDS						
Yuma clapper rail ⁵ <i>Rallus longirostris yumanensis</i>	FE	ASC	-	X	X	X
California black rail ⁵ <i>Laterallus jamaicensis coturniculus</i>	-	ASC	-		X	X
Black tern <i>Chlidonias niger</i>	-	-	-	X	X	
Yellow-billed cuckoo ⁵ <i>Coccyzus americanus</i>	FC	ASC	-	X	X	X
Greater roadrunner <i>Geococcyx californianus</i>	-	-	NP	X	X	X
Long-eared owl <i>Asio otus</i>	-	-	NP	X	X	X
Short-eared owl <i>Asio flammeus</i>	-	-	NP	X	X	X
Burrowing owl <i>Athene cunicularia</i>	-	-	NP	X	X	X
Elf owl ⁵ <i>Micrathene whitneyi</i>	-	-	NP		X	X
Lesser nighthawk <i>Chordeiles acutipennis</i>	-	-	NP	X	X	X
Vaux's swift <i>Chaetura vauxi</i>	-	-	-	X	X	X
Belted kingfisher <i>Ceryle alcyon</i>	-	ASC	NP	X	X	X
Gilded flicker ⁵ <i>Colaptes chrysoides</i>	-	-	-		X	X
Gila woodpecker ⁵ <i>Melanerpes uropygialis</i>	-	-	-		X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	Nevada Status ³	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	Lower Bill Williams River	Lower Gila River
BIRDS						
Olive-sided flycatcher <i>Contopus cooperi</i>	-	-	-	X	X	X
Southwestern willow flycatcher ⁵ <i>Empidonax trailii extimus</i>	FE	ASC	-	X	X	X
Ash-throated flycatcher <i>Myiarchis cinerascens</i>	-	-	-	X	X	X
Brown-crested flycatcher <i>Myiarchis tyrannulus</i>	-	-	-	X	X	X
Vermilion flycatcher ⁵ <i>Pyrocephalus rubinus</i>	-	-	-	X	X	X
Arizona Bell's vireo ⁵ <i>Vireo bellii arizonae</i>	-	-	-	X	X	X
Purple martin <i>Progne subis</i>	-	-	-	X	X	X
Bank swallow <i>Riparia riparia</i>	-	-	-	X	X	X
Swainson's thrush <i>Catharus ustulatus</i>	-	-	-	X	X	X
Bendire's thrasher <i>Toxostoma bendirei</i>	-	-	-	X	X	X
Crissal thrasher <i>Toxostoma crissale</i>	-	-	-	X	X	X
Loggerhead shrike <i>Lanius ludovicianus</i>	-	-	-	X	X	X
Lucy's warbler <i>Vermivora luciae</i>	-	-	-	X	X	X
Sonoran yellow warbler ⁵ <i>Dendroica petechia sonorana</i>	-	-	-	X	X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	Nevada Status ³	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	Lower Bill Williams River	Lower Gila River
BIRDS						
Yellow-breasted chat <i>Icteria virens</i>	-	-	-	X	X	X
Summer tanager ⁵ <i>Piranga rubra</i>	-	-	-	X	X	X
Northern cardinal <i>Cardinalis cardinalis</i>	-	-	-	X	X	X
Abert’s towhee <i>Pipilo aberti</i>	-	-	-	X	X	X
Large-billed savannah sparrow <i>Passerculus sandwichensis rostratus</i>	-	-	-	X	X	X
Sage sparrow <i>Aimophila belli</i>	-	-	-	X	X	X
Grasshopper sparrow <i>Ammodramus savannarum</i>	-	-	-	X	X	
Yellow-headed blackbird <i>Xanthocephalus xanthocephalus</i>	-	-	-	X	X	X
Lawrence’s goldfinch <i>Carduelis lawrencei</i>	-	-	-	X	X	X
REPTILES						
Desert tortoise (Mojave population) ⁵ <i>Gopherus agassizii</i>	FT	ASC	NT	X		
Desert tortoise (Sonoran population) <i>Gopherus agassizii</i>	--	ASC	--		X	X
Banded Gila monster <i>Heloderma suspectum cinctum</i>	-	-	NP	X	X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	Nevada Status ³	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	Lower Bill Williams River	Lower Gila River
REPTILES						
Flat-tailed horned lizard ⁵ <i>Phrynosoma mcalli</i>	-	ASC	-			X
Desert rosy boa <i>Lichanura trivirgata gracia</i>	-	-	-	X	X	X
AMPHIBIANS						
Arizona toad <i>Bufo microscaphus microscaphus</i>	-	-	-	X	X	
Couch's spadefoot toad <i>Scaphiopus couchii</i>	-	-	-		X	X
Relict leopard frog ⁵ <i>Rana onca</i>	FC	ASC	NP	X		
Lowland leopard frog ⁴ <i>Rana yavapaiensis</i>	-	ASC	-		X	
FISH						
Moapa dace <i>Moapa coriacea</i>	FE	-	NE	X		
Virgin River spinedace <i>Lepidomeda mollispinis mollispinis</i>	-	-	NP	X		
Woundfin <i>Plagopterus argentissimus</i>	FE	-	NE	X		
Virgin River chub <i>Gila seminuda</i>	FE	-	NE (NS) ⁶	X		
Flannelmouth sucker ⁵ <i>Catostomus latipinnis</i>	-	ASC	-	X		
INVERTEBRATES						
Aegialian scarab beetle <i>Aegialia knighti</i>	-	-	-	X		

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	Federal Status ¹	Arizona Status ²	Nevada Status ³	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	Lower Bill Williams River	Lower Gila River
INVERTEBRATES						
MacNeill's sootywing skipper ⁵ <i>Pholisora graciellae</i>	-	-	-	X		
Maricopa tiger beetle <i>Cicindela oregona maricopa</i>	-	-	-		X	
Obsolete Viceroy Butterfly <i>Limenitis archippus obsoleta</i>	-	-	-	X	X	X
PLANTS						
Sticky buckwheat ⁵ <i>Eriogonum viscidulum</i>	-	-	NEP	X		
Threecorner milkvetch ⁵ <i>Astragalus geyeri</i> var. <i>triquetrus</i>	-	-	NEP	X		
Las Vegas bearpoppy <i>Arctomecon californica</i>	-	-	NEP	X		
Virgin River thistle <i>Cirsium virginensis</i>	-	-	-	X		
Notes:						
1 Federal Status			3 Nevada Status			
FE = Listed as endangered under the ESA.			NE = Nevada endangered			
FT = Listed as threatened under ESA.			NT = Nevada threatened.			
FP = Proposed for listing as threatened under ESA.			NEP = Nevada critically endangered plant.			
FC = Candidate for listing under ESA.			NP = Nevada protected.			
2 Arizona Status			NS = Nevada sensitive.			
ASC= Arizona wildlife of special concern.			4 Conservation Plan evaluation species.			
			5 Conservation Plan covered species.			
			6 Muddy River population only.			

present sensitive species include the Aegialian scarab beetle, Las Vegas bearpoppy, and Virgin River thistle.

3.4.1.3 Bill Williams River

Vegetation

Vegetation downstream of Alamo Dam within the riparian corridor has been characterized by the Corps (1999), using categories consistent with those used along the LCR. Amounts of these vegetation categories in the Bill Williams River NWR and on Planet Ranch were provided by the NWR (personal communication, K. Blair 2003). Vegetation types and acreages are as follows:

- Cottonwood-Willow (2,168 acres), occurring along the active channel and including substantial areas where saltcedar is the dominant understory;
- Mesquite (742 acres), dominated by honey mesquite, but also including *Atriplex* spp. and screwbean mesquite;
- Mesquite-Saltcedar (161 acres), a mixture of mesquite and saltcedar, often including *Atriplex* spp. and arrowweed;
- Saltcedar (56 acres), including other species, but with more than 50 percent coverage of saltcedar;
- Open Water-Freshwater Marsh (498 acres), mostly equivalent to the Marsh category in the LCR, but including seedlings of woody riparian species; and
- Barren-Open Space/Herbaceous (1,477 acres), consisting of sparsely vegetated areas.

Surrounding areas consist of upland desert scrub.

Fish and Wildlife

The lower Bill Williams River riparian corridor is contiguous with the central part of the LCR planning area, and most of the fish and wildlife species that occur along the mainstem are also reported as occurring here. Wildlife diversity is relatively high, and wildlife includes many of the covered and evaluation species because of the excellent condition of riparian vegetation along the lower Bill Williams River (USACE 1999).

Sensitive Species

COVERED AND EVALUATION SPECIES

Of the 31 covered and evaluation species, 16 are present or could be present within the lower Bill Williams River off-site conservation area (Table 3.4-5) and would benefit from habitat establishment and subsequent management actions on a combination of public and private lands. The Bill Williams River as a whole (including upstream of Alamo Dam) supports a relatively large breeding population of southwestern willow flycatchers (32 known territories) and is another of the key areas targeted for recovery of the species, with a goal of 100 territories

(USFWS 2002d). Four nests were documented along the lower Bill Williams River during 2001 (McKernan and Braden 2002).

OTHER SENSITIVE SPECIES

A total of 68 additional sensitive species that are present or could be present in the lower Bill Williams River off-site conservation area are listed in Table 3.4-5. Habitat requirements and status of these species are described above for the planning area.

3.4.1.4 Lower Gila River

Vegetation

Vegetation along the lower Gila River has been mapped by HEG as part of a Corps Reconnaissance Report (USACE 1995). Vegetation was classified according to Brown et al. (1979) and Ohmart et al. (1988) in a manner generally consistent with what has been done for the LCR. From the Wellton-Mohawk area downstream to the confluence with the Colorado River north of Yuma, in addition to agricultural lands, which occupy much of the floodplain, there are five distinct vegetation communities or series:

- Cottonwood-Willow (2,080 acres), forming a riparian forest that is similar to that described for the LCR and dominated by native Fremont cottonwoods and willows;
- Saltcedar Disclimax (3,687 acres), essentially riparian scrub vegetation, dominated by *Tamarix* spp. but including thickets of other riparian shrubs such as arrowweed;
- Leguminous Short Tree Species (11,959 acres), this community type represents the intermingling of honey mesquite and desert scrub vegetation as the two types are described along the LCR;
- Cattail Series (400 acres), equivalent to the Marsh-Wetlands category mapped along the LCR; and
- Sparsely vegetated open areas (16,102 acres).

These communities occur under conditions similar to those described above for the LCR. As a result of massive floods along the lower Gila River in 1993, many areas were denuded, but subsequently recolonized by cottonwoods and willows, creating opportunities for habitat establishment by taking actions to foster the reestablishment of native riparian vegetation (USACE 1995; personal communication, B. Werner 2003).

Fish and Wildlife

Fish that are present along the lower Gila River are limited almost entirely to non-native, warm-water species that occur in areas of permanent water sustained by return flows from agriculture (USFWS 1994). Wildlife along the lower Gila River is similar to that described previously for the LCR, although dominated by Sonoran Desert species. Riparian forest supports a rich variety of neotropical migrant species, including several species covered by the Conservation Plan. Marshes along the lower Gila River are structurally and functionally similar to those along the LCR and support the same species.

Sensitive Species

COVERED AND EVALUATION SPECIES

Of the 31 covered and evaluation species, 17 are present or could be present within the lower Gila River off-site conservation area (Table 3.4-5) and would benefit from habitat establishment and subsequent management actions on a combination of public and private lands. The lower Gila River is included as part of the LCR region as one of the targeted areas for recovery of the southwestern willow flycatcher.

OTHER SENSITIVE SPECIES

A total of 61 additional sensitive species that are present or could be present in the lower Gila River off-site conservation area are listed in Table 3.4-5. Habitat requirements and status of these species are described above for the planning area.

3.4.2 Environmental Consequences

Significance Criteria

The proposed action would result in a significant impact if it would result in any of the following:

- have a substantial adverse effect on any sensitive natural vegetation community identified for special status under local, state, tribal or Federal laws, regulations, or policies;
- have a substantial direct or indirect effect on sensitive wildlife species identified for special status under local, state, tribal, or Federal laws, regulations, or policies ;
- have a substantial adverse effect on any riparian vegetation or other sensitive natural community identified in local or regional planning documents, policies, and regulations of the CDFG, AGFD, NDOW, BLM, Reclamation, BIA, Service, and county and tribal governments;
- have a substantial adverse effect on wetlands and waters of the U.S. as covered by section 404 of the CWA;
- have a substantial adverse effect on native resident or migratory wildlife corridors, breeding or spawning habitats, and nursery habitats;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (discussed in section 3.11); or
- conflict with provisions of an approved local, state, tribal, or Federal habitat or species conservation plan (discussed in section 3.11).

3.4.2.1 *Alternative 1: Proposed Conservation Plan*

Impacts

The following analysis describes the impacts of (1) issuing the section 10(a)(1)(B) permit, which would authorize the incidental take of up to 27 covered species from implementation of both the covered activities and the Conservation Plan, and (2) implementing the Conservation Plan, which could have short-term and long-term impacts not only on covered species' habitats, but on habitat for non-covered common and sensitive species as well. The covered activities are not part of the proposed action, and their impacts are not analyzed in this EIS/EIR, with the exception of the incidental take that would be allowed as a result of the issuance of the section 10(a)(1)(B) permit.

IMPACTS OF ISSUING THE SECTION 10(A)(1)(B) PERMIT

Impact BIO-1: Issuance of the section 10(a)(1)(B) permit would authorize the incidental take of up to 27 covered species from implementation of both the covered activities and the Conservation Plan. The description of the estimated level of incidental take associated with implementing the covered activities and the Conservation Plan is summarized for each covered and evaluation species in Table 2.1-3. A detailed description of the impact analysis methods and results is provided in the LCR MSCP HCP. The impacts of issuance of the section 10(a)(1)(B) permit on each species are also summarized in Table 2.1-3 (see column entitled "Summary of Expected Outcomes").

Impacts to covered species resulting from the incidental take caused by the covered activities includes loss of habitats for covered species. Flow-related covered activities are estimated to affect 2,540 acres of land cover types that provide covered species habitat (2,008 acres of cottonwood-willow, 133 acres of marsh, and 399 acres of river and backwaters), while non-flow-related covered activities would affect 1,454 acres of land cover types that provide covered species habitat (134 acres of cottonwood-willow, 110 acres of marsh, 590 acres of honey mesquite III, and 620 acres of honey mesquite IV). Degradation or loss of land cover types that provide habitat for wildlife species would occur linearly along the LCR corridor over the term of the LCR MSCP. Impacts to covered species would also result from harassment and entrainment.

The effects of the incidental take to biological resources cannot be evaluated independently of the Conservation Plan. As shown in Table 2.1-3, the Conservation Plan would effectively offset and compensate for the effects of the incidental take that would result from both the covered activities and the implementation of the Conservation Plan. Thus, implementation of the covered activities and the Conservation Plan are not likely to negatively affect the overall populations of covered species within the LCR MSCP planning area or regionally. Therefore, impacts of issuing the section 10(a)(1)(B) permit would be *less than significant*.

IMPACTS OF IMPLEMENTING THE CONSERVATION PLAN

The Conservation Plan would establish 8,132 acres of land cover types supporting habitat for covered species, including 5,940 acres of cottonwood-willow, 1,320 acres of honey mesquite type III, 512 acres of marsh, and 360 acres of backwaters. Habitat would be established

primarily on agricultural lands and saltcedar areas, some of which are mixed with honey mesquite and screwbean mesquite. Impacts on covered and evaluation species from the implementation of covered activities and the Conservation Plan would be avoided, minimized, or fully mitigated by conservation measures that would maintain existing habitat, establish new habitat or enhance existing habitat, and enhance the populations of some species. Impacts on other special-status species would also be avoided or minimized to the extent practicable through the measures to protect the covered species.

The actions necessary to establish the desired habitats for covered species could have short-term and/or long-term effects not only on the covered species (i.e., take), but also on other sensitive or special status species; riparian vegetation, wetlands, or other sensitive natural communities; and resident or migratory fish or wildlife species. Short-term effects (e.g., physical disturbances, biological disturbances, and altered irrigation drainage) would result from construction activities, while long-term effects would result from the conversion of one land cover type to another. In general, habitat establishment actions are intended to provide long-term beneficial impacts that would offset any short-term losses. No woody riparian, marsh, or aquatic land cover types that support covered, evaluation, and other special-status species would be removed as part of habitat establishment activities. The Conservation Plan includes monitoring and evaluation to determine if the goals and objectives of the plan are being met as well as an adaptive management strategy to address any problems or failure to meet those goals and objectives.

The four habitat establishment concepts described in Chapter 2 would involve the conversion of agricultural lands, saltcedar, desert scrub, or other land cover type to cottonwood-willow or mesquite land cover types; the establishment of backwaters; and the establishment of marshes by providing a water source to existing topographically low areas (e.g., old river oxbows) or newly excavated areas. The impacts of these activities on biological resources and of take for covered species are addressed below, as are impacts from population enhancement measures and maintenance activities.

IMPACTS OF CREATING HABITAT FOR COTTONWOOD-WILLOW AND HONEY MESQUITE-ASSOCIATED COVERED SPECIES

Impact BIO-2: The establishment of 7,260 acres of cottonwood-willow and honey mesquite land cover would increase the extent of cottonwood-willow riparian forest and mesquite woodland sensitive communities. As described above, covered activities would remove or degrade an estimated 3,352 acres of cottonwood-willow and honey mesquite land cover types. Loss of this native vegetation, along with associated individuals of common and sensitive wildlife species and covered species, as a result of covered activities would be more than offset by creation of 7,260 acres of the same type of habitats through implementation of the Conservation Plan. This represents a *beneficial* impact for vegetation as well as for the covered and non-covered wildlife species using these habitat types. Expansion of these native plant communities would provide habitat for native species, including species whose populations have declined due to loss or degradation of habitat, and help to restore the natural ecosystems that these communities can support.

1 IMPACTS FROM CONVERSION OF AGRICULTURAL LAND TO HABITAT

2 **Impact BIO-3: Clearing, grading, planting, and site maintenance during conversion of**
3 **agricultural lands to cottonwood-willow and/or honey mesquite land cover types would**
4 **result in the elimination of existing low value habitat used by resident and migratory**
5 **wildlife, removal of weedy vegetation and crops, alteration of habitat characteristics through**
6 **changes in local hydrology and exposure of soil to erosion, and elimination or displacement**
7 **of resident wildlife.** Establishing cottonwood-willow and honey mesquite (Type III) land
8 cover types to compensate for losses of those types from covered activities (3,352 acres) and
9 implementing the Conservation Plan would result in short-term (less than 1 to 5 years)
10 disturbances and long-term alteration of vegetation and wildlife habitat. The cottonwood-
11 willow and honey mesquite vegetation would be established in an integrated mosaic with
12 marshes and backwaters. Short-term disturbances associated with converting agricultural land
13 to these habitats include grading to provide topographic diversity where needed and seeding of
14 native species. Soil disturbances would increase the potential for erosion and sediment runoff.
15 These disturbances would occur for a period of days to months, usually within a single year.
16 Recovery of the disturbed area (primarily vegetation) would progress over 3 or more years,
17 depending on the land cover type and factors such as weather patterns during that time.
18 Irrigation to establish the new plants could result in short-term alteration in site hydrology and
19 soil moisture regimes. Impacts associated with converting agricultural land to backwaters or
20 marshes are discussed below under **Impacts BIO-5 and BIO-6**, respectively. Long-term effects
21 of maintenance are discussed under **Impact BIO-7**.

22 *Vegetation.* Conversion of agricultural lands to cottonwood-willow and honey mesquite plant
23 communities would have a *less than significant impact* on existing vegetation because the plants
24 that would be replaced are primarily non-native species (i.e., crops and weeds along farm roads
25 and ditches). Furthermore, the amount of agricultural land to be affected represents a small
26 amount (less than 2 percent) of that present in the planning area. Irrigation would continue, but
27 the timing and amounts would be changed to benefit the native species being restored. Soil
28 disturbance resulting from the vegetation restoration efforts initially would favor growth of
29 weeds from seed present prior to the conversion. Soils would stabilize over time, thus making
30 the disturbed area less suitable for weeds and reducing the potential for erosion and sediment
31 transport. Weed control would be implemented as part of the Conservation Plan to reduce the
32 seed source and competition with native species.

33 Several *beneficial impacts* on vegetation would result from the proposed action. The amount of
34 native riparian plant communities in the planning area would be increased as described in
35 **Impact BIO-2**. In addition, airborne dust produced by agricultural grading would be reduced,
36 reducing the effects of dust (physical damage and reduced photosynthesis) on adjacent riparian
37 vegetation.

38 *Common Wildlife.* Converting agricultural land to native riparian vegetation along the LCR
39 would have short-term, *less than significant impacts* on a number of common wildlife species
40 through temporary disturbances. Individuals of less mobile species, such as lizards, snakes,
41 and small mammals (e.g., mice), would be lost, but the newly established plant community
42 would be colonized by these and other common riparian species from nearby areas. More
43 mobile species such as striped skunk, raccoon, Audubon cottontail, and coyote would move out
44 of the disturbance area. The change in land cover type would alter the species composition and

abundance of individuals within a species to favor a greater diversity and a lower abundance for species adapted to human disturbance. The establishment of additional native vegetation would allow population expansion for these species, a *beneficial impact*. The level of disturbance to wildlife by agricultural workers and machinery would be reduced. In addition, the conversion of agricultural land to riparian vegetation would lessen the input of sediment, salts, nutrients, and agricultural chemicals to the river, improving water quality and aquatic habitat conditions. The establishment of riparian vegetation along an expanded portion of the river would provide increased shading, water filtration, and nutrient and pollutant uptake, improving water quality and aquatic habitat conditions downstream. Establishing native plant communities would aid in soil stabilization, a benefit for micro-organisms and invertebrates that live in the soil as well as vertebrates that burrow in the ground. Irrigation that mimics natural hydrologic regimes would also benefit native ground-dwelling species adapted to those conditions.

Non-Covered Sensitive Species. Conversion of agricultural lands to cottonwood-willow and honey mesquite land cover types could affect 31 species of non-covered sensitive bird species, (see Table 3.4-4), that use agricultural lands and irrigation ditches for foraging habitat. In addition, the burrowing owl will also use field berms and embankments as nesting habitat. Implementation of the Conservation Plan could affect burrowing owls by:

- Removing nesting habitat provided by berms, earthen embankments, and other such features that are associated with agricultural-related infrastructure that could support burrowing owl nesting burrows as a result of conversion to native habitats; and
- Disturbing nesting burrows as a result of maintaining roads, ditches, and other infrastructure in LCR MSCP conservation areas that could support nesting burrows.

Other sensitive mammal, reptile, amphibian, invertebrate, and plant species are not expected to use agricultural fields and would not be adversely affected by conversion of this land use to natural plant communities.

Conversion of agricultural lands associated with implementation of the Conservation Plan would have a *less than significant impacts* on all non-covered sensitive species. The creation of 8,132 acres of covered species habitat proposed under the LCR MSCP would occur within the participating states of Arizona, Nevada, and California. Assuming that all conservation areas would be established on agricultural land, this would comprise only a small percentage, less than 2 percent of agricultural lands in the planning area would be converted in the process. Thus, individuals displaced during the conversion would have abundant suitable habitat in the vicinity.

In addition, the establishment of marshes and backwaters, which would be included in the integrated mosaics to be developed, would provide higher value habitat for non-covered sensitive water-associated birds (e.g., great blue heron, great egret, snowy egret, black-crowned night heron, and Clark's grebe) than that present in irrigated fields. Soil disturbance and irrigation resulting from activities to establish the new plant communities would cause short-term disturbances that would be *less than significant* and offset by the increase in native vegetation. These impacts would be *beneficial* to native species in the long term as described above for vegetation and wildlife.

Covered Species. Covered species are not expected to be present in agricultural areas and, thus, would not be affected by land cover type conversion activities.

Summary. Overall, the short-term impacts of the native vegetation establishment would be *less than significant* because the actions taken would not have substantial adverse effects on sensitive species, communities, or habitats due to implementation of measures to avoid or minimize effects on covered species in the Conservation Plan. These measures would also protect non-covered sensitive species, as well as common native species present in the agricultural areas to be used. In addition, voluntary "Implementation Measures," discussed below, would be used to further reduce potential, less than significant impacts to non-covered sensitive species. Long-term impacts would be *beneficial* to vegetation and both covered and non-covered sensitive species, as well as common wildlife, that use cottonwood-willow and mesquite land cover types by reestablishing a more natural ecosystem.

IMPACTS FROM CONVERSION OF UNDEVELOPED LAND TO HABITAT

Impact BIO-4: Clearing, grading, planting, and site maintenance during conversion of undeveloped lands (primarily saltcedar) to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing non-native vegetation and the habitat it provides for wildlife, short-term effects on habitat characteristics from alteration of local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife. As described under **Impact BIO-3**, establishing native riparian vegetation to compensate for losses of that land cover type from covered activities (3,352 acres) and implementing the Conservation Plan would result in short-term disturbances and long-term alteration of vegetation and wildlife habitat as a result of grading, removal of saltcedar, and seeding of native species as well as maintenance (e.g., irrigation) activities. Impacts associated with converting undeveloped land to backwaters or marshes are discussed below under **Impacts BIO-5 and BIO-6**, respectively. Long-term effects of maintenance are discussed under **Impact BIO-7**.

Vegetation. Conversion of saltcedar-dominated land cover to establish cottonwood-willow and honey mesquite land cover types would have *beneficial impacts* on vegetation because saltcedar is a non-native, invasive species. The conversion would only affect a relatively small proportion (less than 3 percent) of the saltcedar present in the planning area. Irrigation would occur to help establish the native species being restored. Habitat creation efforts temporarily would disturb soils, which would favor growth of weeds from seed present prior to the conversion. Soils would stabilize over time, thus making the area less suitable for weeds and reducing the potential for erosion and sediment transport. Weed control would be implemented as part of the Conservation Plan to reduce the source of seeds and competition with native species.

The amount of native riparian plant communities in the planning area would be increased as described in **Impact BIO-2**. Furthermore, the removal of saltcedar and its replacement by native riparian vegetation would reduce the incidence of fires and their adverse effects on native vegetation (e.g., preventing natural cycles in regeneration and increasing the potential for proliferation of weedy species), a *beneficial impact*.

Common Wildlife. Individuals of common species using the saltcedar would be displaced or lost during the conversion process, and those in adjacent areas would be disturbed by the

vegetation establishment activities (e.g., noise and human presence). Impacts would be *less than significant* because work would be scheduled, when feasible, to avoid the nesting season of covered species that may use adjacent riparian areas. This would avoid the nesting season of most, if not all, common birds as well. It is anticipated that most of the work would be scheduled outside of the breeding season. Relatively small areas of saltcedar (estimated to be less than 380 acres per year) would be removed over 25 to 30 years during the term of the LCR MSCP and would not be concentrated in one portion of the planning area, thereby minimizing the amount of habitat for common species that would be affected at any particular location and time. Soil disturbance during the conversion process would have short-term effects on micro-organisms and invertebrates that live in the soil as well as vertebrates that burrow in the ground (e.g., small mammals) or are associated with ground cover (e.g., lizards and snakes). These impacts would be *less than significant* because measures in the Conservation Plan would be implemented to rapidly stabilize soils and allow colonization by native species. Irrigation to aid in establishment of the new plant communities would have *less than significant* effects on ground-dwelling animals. The change in moisture regime would be short-term, located in relatively small areas at a time, and the locations phased over 25 to 30 years. Individuals of common wildlife species in those areas would avoid or adapt to the changed conditions. The newly established habitat would be colonized by common riparian species from nearby areas, and the establishment of additional native vegetation would likely allow population expansion for these species, a *beneficial impact* (i.e., an expansion of native species that add to the complexity and function of the ecosystem).

Non-Covered Sensitive Species. Several sensitive bird species may nest in saltcedar or saltcedar-dominated land cover types, and a few reptiles and amphibians are likely to be present. Loss of saltcedar-dominated land cover types through conversion to cottonwood-willow or honey mesquite would affect individuals of species using those areas by causing them leave the disturbance area, to at least temporarily, and by causing mortality (directly or indirectly). Short-lived sensitive species generally have high reproductive and colonization potentials that would aid in rapid recovery from soil and vegetation disturbance impacts. Impacts on non-covered sensitive species would be *less than significant* for the following reasons. The total amount of the saltcedar-dominated land cover types in the planning area is large relative to the amount potentially lost (about 3 percent) so that other similar habitat would be available. The Conservation Plan would be phased in over 25 to 30 years and would not be concentrated in one portion of the planning area. The maximum amount of habitat to be developed per year is estimated to be 300 acres for cottonwood-willow and 80 acres per year for honey mesquite (see Tables 2.1-6a and b). Implementation of Conservation Plan measures to minimize the amount of construction work for site conversion during the breeding season of most birds also reduces the potential for impacts. This combination of factors minimizes the potential for adverse effects of the conversion on non-covered sensitive species.

Short-term effects of soil disturbance and irrigation resulting from activities to establish the new plant communities would be *less than significant* and, in the long-term, *beneficial* to native sensitive species as described above for vegetation and common wildlife.

Covered Species. Cottonwood-willow and honey mesquite (Type III) would be established in an integrated mosaic with backwaters and marshes where undeveloped lands are converted to cottonwood-willow habitat or within existing degraded riparian areas. Riparian woodland

establishment activities involving removal of saltcedar and planting of mesquite and understory species would cause short-term disturbances in the new habitat as well as in the adjacent areas, with soil disturbance only in the new areas. Two covered bird species, Sonoran yellow warbler and summer tanager, are known to nest in saltcedar. Both species are uncommon in the planning area, making the probability of any being present at the specific locations being converted unlikely. Impacts on covered species would be *less than significant* due to the implementation of measures to avoid and minimize effects on these species as described in the Conservation Plan. For example, existing native riparian trees would be avoided, only a portion of the saltcedar would be removed from the planning area, and BMPs would be used to prevent erosion and sediment runoff from disturbed soils. In addition, phasing of the proposed action as described above under non-covered sensitive species, would minimize the potential for effects on covered species. Irrigation to establish the new plants and to mimic hydrologic conditions that support this habitat type would not affect covered species in the short term because none would be present as the vegetation is being established. Impacts in the long-term would be *beneficial* to covered species by helping to establish and maintain the native habitat.

Summary. Overall, impacts on vegetation, wildlife, non-covered sensitive species, and covered species from construction activities would be *less than significant*. Nonetheless, voluntary Implementation Measures, discussed below, would be used to reduce potential, less than significant impacts to non-covered sensitive species. Long-term impacts from establishing native riparian plant communities would be *beneficial* to vegetation (see **Impact BIO-2**) and many wildlife species, including both covered and non-covered sensitive species, that use saltcedar but whose native habitat is provided by cottonwood-willow and/or honey mesquite.

IMPACTS ASSOCIATED WITH ESTABLISHMENT OF MARSHES

Impact BIO-5: Clearing, grading, planting, and site maintenance during establishment of marsh would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife. Covered activities would affect 243 acres of marsh along with its associated wildlife. Implementing the Conservation Plan would result in establishing 512 acres of new marsh, which would involve excavation of uplands, such as agricultural lands and saltcedar, and providing a water source, followed by planting of emergent vegetation; or providing a water source to an existing topographically low area, such as an old river oxbow, and planting emergent vegetation. Construction of new marshes is more likely to occur than restoration of existing marshes, and both would likely involve major reconstruction activities. At some locations, such work could occur immediately adjacent to existing marshes in order to expand their size. The establishment activities would occur in the same land cover types (agricultural fields or saltcedar stands) discussed in **Impact BIO-3** and **BIO-4**, but much smaller areas would be affected at any one time (20 to 40 acres per year). Soil disturbance associated with clearing and grading would be in topographically low areas, and erosion and sediment runoff would not affect adjacent areas. Impacts on vegetation, wildlife, non-covered sensitive species, and covered species would be similar to those described in the above impact analyses. The new marsh would be colonized by wildlife species adapted to that land cover type. Loss of upland land cover types would be permanent but a *less than significant impact* because the habitat value for the area lost would be

low and the size affected would be small. No loss of sensitive vegetation would occur. Where establishing new marsh occurs adjacent to an existing marsh, impacts on residents of the existing marsh would be minimized through measures in the Conservation Plan implemented to minimize effects on covered species. These measures would also reduce the potential for impacts on vegetation and non-covered species. The value of the habitat created would be equal to or greater than the value of that lost, resulting in replacement or a net gain in habitat value, which would be a *beneficial impact*, and mitigation for impacts of covered activities would be provided as planned.

Summary. The overall impacts on vegetation, wildlife, non-covered sensitive species, and covered species would be *less than significant* in the short term and *beneficial* in the long term by providing marshes mixed within native riparian land cover types (i.e., more vegetation and habitat complexity to support a diversity of native animal species, including sensitive species). Nonetheless, voluntary Implementation Measures, discussed below, would be used to reduce potential, less than significant impacts to non-covered sensitive species.

IMPACTS ASSOCIATED WITH THE ESTABLISHMENT OF BACKWATERS

Impact BIO-6: Clearing, grading, and site maintenance during establishment of backwaters would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife. Covered activities would affect 399 acres of backwater and river land cover types. Backwaters (360 acres) connected to and disconnected from the river or reservoir would be established to provide locations for release of reared covered fish species as part of the Conservation Plan. The backwaters not connected to the river or reservoirs would also be isolated from the non-native fish populations in the river and reservoirs. Water levels would be maintained, and vegetation would be controlled through design (depth) and other means. In some cases, the possibility exists for establishment activities to occur in existing backwaters in order to enlarge the area and increase its habitat values. All such activities would be undertaken using avoidance and minimization measures in the Conservation Plan.

Vegetation. Conversion of agricultural land or saltcedar-dominated areas to backwaters would have *less than significant impacts* on vegetation as described in **Impacts BIO-3 and BIO-4**. Because soil disturbance associated with clearing and grading would be in topographically low areas, erosion and sediment runoff would not affect plants in adjacent areas. The temporary loss or disturbance of riparian or marsh vegetation associated with existing backwaters, however, would represent a short-term, *less than significant impact* to wetlands that is addressed under **Impact BIO-9**. This impact would be more than offset by the increase in habitat value resulting from the creation of backwaters and would require no mitigation. Providing water for maintenance of the backwaters would ensure the continued presence of high value habitat for the aquatic species associated with backwaters.

Common Wildlife. Excavation, vegetation planting, and other establishment activities in areas that were previously agricultural lands or saltcedar-dominated areas would have short-term effects on common wildlife populations currently present that would be *less than significant* as described in **Impacts BIO-3 and BIO-4**. Loss of upland vegetation in areas excavated would be permanent but would result in a *less than significant impact* because the habitat value for the area

lost would be low and the size affected at any one location would be small. Disturbance of existing backwaters during enlargement activities would cause temporary impacts on animal species present. The value of the habitat created would be equal to or greater than the value of that lost, resulting in replacement or a net gain in habitat value, and mitigation for impacts of covered activities would be provided as planned. Creation of backwaters would be a *beneficial impact* for common wildlife that use such areas.

Non-Covered Sensitive Species. Impacts on non-covered sensitive species would generally be *less than significant*, as described under **Impact BIO-3** and **BIO-4** for backwater establishment in agricultural lands or saltcedar-dominated areas, although due to the much smaller size of backwaters to be established, impacts would be lessened. The new backwaters would have *beneficial impacts* as described above for common wildlife. Temporary disturbances to non-covered sensitive species during enlargement of existing backwaters would have the potential for *significant impacts that are mitigable to less than significant* through the implementation of **Mitigation Measure BIO-1**, particularly for birds that require backwater-type habitats, if a substantial number of individuals or breeding were affected. Measures to protect covered species would avoid or minimize impacts on non-covered species in most, but not all, situations. For example, breeding or aggregations of some species may not be avoided if they are not known to be present. The potential for significant impacts would be site-specific and depend on the timing of the work.

Covered Species. Impacts on any covered species present at the backwater establishment sites would be temporary and *less than significant* due to implementation of measures to minimize effects on these species as described in the Conservation Plan. However, if the breeding season or nursery areas of some species, such as fish, cannot be avoided, impacts could be *significant* but offset by the amount of backwater area established so that additional mitigation would not be required. Providing water for the created or enhanced backwater sites would result in a *beneficial impact* to covered species by maintaining the availability of this habitat.

Summary. Overall, long-term impacts on vegetation, common wildlife, non-covered sensitive species, and covered species would be *beneficial* due to implementation of protection measures described in the Conservation Plan and development of habitat diversity (i.e., backwaters within native riparian land cover types). In the short term, impacts of establishing backwaters where small backwaters already exist would have the potential to have *less than significant* or *significant but mitigable to less than significant* impacts on non-covered sensitive species. Voluntary Implementation Measures, discussed below, would be used to reduce potential, less than significant impacts to non-covered sensitive species.

IMPACTS OF MAINTENANCE ACTIVITIES

Impact BIO-7: Maintenance of established habitats would result in the removal of invasive non-native vegetation, alteration of habitat characteristics through changes in local hydrology, and short-term elimination or displacement of resident wildlife. A number of maintenance activities would be necessary to ensure that the established habitats retain their value to covered species. These include irrigation of some cottonwood-willow and honey mesquite habitats, burning in marshes, and removal of saltcedar and giant cane (*Arundo donax*) that invade these areas. Maintenance of infrastructure in converted agricultural lands would also affect species using these areas.

1 *Vegetation.* Periodic removal of saltcedar and giant cane as well as burning in marshes would
2 cause temporary loss or disturbance to vegetation in small areas where such activities occur.
3 Removal of non-native invasive species such as saltcedar and giant cane as they colonize the
4 established habitat areas would be *beneficial* to vegetation of the area by helping to maintain the
5 native species composition of the plant community. Flood irrigation of cottonwood-willow
6 areas in spring, early summer, and later in the season, as well as irrigation to maintain moist
7 soil during the southwestern willow flycatcher breeding season (in habitat for that species)
8 could result in long-term alteration in site hydrology. Irrigation to maintain honey mesquite
9 could also cause long-term alteration of the site hydrology. Changes in hydrology would affect
10 plant growth for target species as well as all other species, including non-native weedy species.
11 Irrigation could result in a more dense understory of grasses, herbs, and shrubs depending on
12 the amount and timing of the irrigation as well as the duration and extent of moisture near the
13 soil surface. Impacts on vegetation other than the target tree species could range from *less than*
14 *significant* to *beneficial*. The irrigation would be *beneficial* for the target species by assisting their
15 growth. Seral stage management for specific plant species and community structure (e.g.,
16 burning in marshes and tree trimming or minor amounts of clearing in riparian woodlands)
17 would also cause disturbances at intervals over the long term. These disturbances would be *less*
18 *than significant* for target plant communities because the disturbances necessary to maintain the
19 seral stage would be of short duration and at intervals with no loss of native plant community.
20 Periodic burning and other management methods to maintain marshes would have
21 intermittent, short-term (generally less than 1 year) *less than significant* impacts on marsh
22 vegetation. These measures would control marsh vegetative growth but would not eliminate it.
23 Vegetation would begin to grow again within one year but would not reach densities that
24 require repeated maintenance for several years.

25 *Common Wildlife.* Maintenance activities would result in temporary and intermittent
26 disturbances to wildlife in and adjacent to the areas where such activities occur. Removal of
27 saltcedar and giant cane as well as burning of marsh vegetation would introduce noise and
28 human presence during the removal process. Burning of marsh vegetation would also cause a
29 temporary alteration of the habitat characteristics resulting in more open water and less dense
30 vegetation until the vegetation grows back. Marsh residents (primarily birds) that require
31 dense vegetation cover would be displaced to areas with such cover, while species that use
32 open water would return after the maintenance activities were complete. Some individuals of
33 wildlife species could be lost as a result of maintenance activities, but most would be expected
34 to leave the marsh when it is burned or otherwise manipulated. Irrigation would affect wildlife,
35 particularly reptiles, amphibians, and invertebrates, by altering habitat characteristics to be
36 more favorable for species preferring higher moisture and less favorable for those preferring
37 drier habitats. Changes in understory vegetation could also influence the abundance and
38 species composition of common wildlife species. Maintenance of earthen berms associated with
39 roads, canals, or other infrastructure would periodically disturb these areas and the organisms
40 residing there. Impacts of maintenance activities on common wildlife would generally be *less*
41 *than significant* in the short term and *beneficial* in the long term, assuming that maintenance
42 activities such as burning would not occur every year. The disturbances associated with
43 maintenance activities would occur in relatively small areas and be of short duration so that few
44 individuals of common species would be affected at any one time. Timing of these activities to
45 minimize impacts on covered species, including breeding, would also minimize effects on

common species. Maintenance would ensure that high value habitat remains for use by a variety of wildlife species.

Non-Covered Sensitive Species. Effects of management activities on non-covered sensitive species would be similar to those described for common wildlife. In addition, marsh management actions implemented in conservation areas within California would be designed to avoid mortality of fully protected species. Impacts of maintenance activities on non-covered sensitive species would be *less than significant* because measures to minimize effects on covered species that could be in the same area would also protect the non-covered species.

Covered Species. Removal of saltcedar and giant cane would have the potential to disturb covered species through noise and human presence as described for wildlife. Periodic burning and other management methods to maintain the marsh would have intermittent, short-term (less than 1 year) impacts on covered species and would maintain habitat preferred by these species. Maintenance activities, other than water level control, would have intermittent effects on species using backwaters. Maintenance activities would have *less than significant impacts* on covered species because all such activities would be planned and timed to avoid or minimize impacts on covered species. This includes avoiding the breeding season for covered species, such as the Yuma clapper rail, to the maximum extent feasible. Managing water levels in marshes for selected species (e.g., Yuma clapper rail and California black rail) would have *beneficial* impacts on those species, as well as other marsh species of plants and animals. Managing water levels would result in little habitat disturbance and would help maintain marsh vegetation and preferred habitat conditions, such as water depth, for covered species.

Summary. Overall, the long-term impacts of maintenance activities would be *less than significant* or *beneficial* for biological resources. Short-term impacts of maintenance activities would be *less than significant* because the actions taken would not have substantial adverse effects on covered species or their habitats due to implementation of measures to minimize or avoid such effects. Take of covered species would be evaluated through monitoring and analysis of the data collected as described in the Conservation Plan. The frequency and extent of maintenance activities would be regulated through adaptive management so that take levels established in the 10(a)(1)(B) permit are not exceeded. These measures would also minimize impacts on other species present. In addition, voluntary Implementation Measures, discussed below, would be used to further reduce potential, less than significant impacts to non-covered sensitive species.

IMPACTS OF POPULATION ENHANCEMENT MEASURES

Impact BIO-8: Population enhancement activities for covered fish and bird species could adversely affect existing individuals or populations of covered or sensitive species. Population enhancement activities include rearing and release of covered fish (bonytail and razorback sucker) and control of predatory non-native aquatic species (primarily fish) before their release. Population enhancement activities for covered birds include installation of nest boxes for cavity nesting birds (e.g., elf owl, gilded flicker, and Gila woodpecker) and control of brown-head cowbird nest parasitism.

Vegetation. Population enhancement for covered fish and bird species would have essentially no impacts on vegetation.

Common Wildlife. Release of covered fish species raised in a hatchery to habitats established for rearing them would alter the ecology of the aquatic habitat through the foraging activities of these fish as well as provide prey for predatory fish, reptiles, and amphibians. The bonytail feeds primarily on insects, while the razorback sucker feeds on the bottom eating vegetation and bottom ooze. Consequently, foraging by the stocked covered fish primarily would affect lower trophic levels. This would cause some competition with the non-native and non-covered native fish that feed on these same resources but would have essentially no effect on the populations of either type of fish through direct predation by the covered species. Terrestrial ecology would also be affected to the extent that the stocked covered fish provide prey for piscivorous (fish-eating) birds. How much benefit the birds receive would depend on the number of fish stocked as well as their susceptibility to predation at each life stage by birds. The benefits are likely to be minor. Establishment of more natural aquatic community interactions would also benefit other native aquatic species (both invertebrates and vertebrates). Removal of non-native piscivorous fish and non-native amphibians before release of the covered fish has the potential to incidentally and adversely affect native (non-covered) aquatic invertebrates, reptiles, amphibians, and fish that are also present in the treatment areas through habitat disturbances, stress, or direct mortality during the non-native removal process. BMPs and all applicable permits would be followed for predator control to minimize such effects, resulting in *less than significant* impacts.

Installation of nest boxes and control of brown-headed cowbird nest parasitism for covered bird species would result in temporary and localized disturbances in wildlife habitat. These disturbances would have *less than significant* impacts on common wildlife due to their intermittent occurrence, limited area of disturbance, and implementation of measures to minimize impacts on covered species that would also protect common wildlife.

Non-Covered Sensitive Species. Several non-covered sensitive bird species prey upon fish and could potentially benefit from foraging on the stocked covered fish species. Those piscivorous bird species that are uncommon to rare visitors would receive negligible benefits while common species (e.g., double-crested cormorant, belted kingfisher) could receive minor benefits. Installation of nest boxes and control of brown-headed cowbird nest parasitism for covered species would cause a temporary disturbance in the habitat. Impacts on non-covered sensitive species would be *less than significant* because the measures to reduce impacts on covered species would also protect non-covered species and the area of disturbance would be small and of short duration.

Covered Species. Establishment of more natural aquatic community interactions would be *beneficial* to the covered species by providing habitat more like that in which they evolved. Although non-native predatory species removal would occur before the covered fish species are stocked, such efforts are unlikely to eradicate all of the non-natives, particularly in riverine or reservoir habitats where isolation of an area for covered species is not feasible. Loss of some stocked covered fish due to predation by non-native species would at least partially reduce the benefits of the stocking. Incidental capture of some individuals of the stocked fish by fishermen angling for non-native game fish would also be an adverse effect on the stocked fish populations. Although loss of stocked covered species to predation by non-natives and to fishermen would have an adverse effect on the stocked fish populations, this would not be an impact of the proposed action. In the most likely case, predator removal prior to stocking

should reduce predation losses, and fishermen are not likely to target these species, which are not prized game fish. Overall, the stocking is expected to *benefit* the covered fish species. Installation of nesting boxes in riparian woodlands and cowbird control activities would result in a temporary disturbance in the habitat due to human presence and noise associated with the activity. Use of avoidance and minimization measures in the Conservation Plan would result in *less than significant* impacts on covered species. These actions would *benefit* the bird species in the long term by increasing nesting habitat and reproductive success.

Summary. Overall, long-term impacts on covered species would be *beneficial*, while short-term impacts resulting from disturbances due to enhancement activities would be *less than significant*. Nonetheless, voluntary Implementation Measures, discussed below, would be used to reduce potential, less than significant impacts to non-covered sensitive species.

IMPACTS ON WETLANDS AND WATERS OF THE U.S.

Impact BIO-9: Native land cover type establishment and maintenance could temporarily affect wetlands and waters of the U.S. To establish habitat mosaics, marsh, backwaters, cottonwood-willow, and honey mesquite land cover may be established or enhanced immediately adjacent to existing wetlands and waters protected under section 404 of the CWA. Enhancement of existing backwaters would require activities within wetlands and waters of the U.S., while expansion of marshes by excavation of immediately adjacent uplands would place activities next to wetlands or waters of the U.S. Consequently, land cover type establishment-related activities (e.g., grading) could result in temporary disturbances to adjacent wetlands and waters and to their associated vegetation and wildlife. Enhancement/enlargement activities in existing backwaters would temporarily disturb wetlands and waters of the U.S. and their associated vegetation and wildlife (see **Impact BIO-6**). Future actions to maintain established marshes and backwaters (e.g., dredging, burning) could have similar impacts on wetlands and waters at intervals (see **Impact BIO-7**). Any activities in wetlands and waters of the U.S. would be conducted in accordance with all applicable permits for such activities on a site-specific basis. Therefore, the temporary impacts associated with backwater enhancement would be *less than significant*.

Summary. Overall, long-term *beneficial impacts* would offset the temporary, *less than significant impacts*.

Implementation Measures

The following Implementation Measures would, to the extent practicable, be employed to avoid and minimize potential impacts on non-covered sensitive species that could be associated with implementation of the LCR MSCP conservation measures. While not required to mitigate any identified significant impacts, these measures would be implemented on a voluntary basis to reduce potentially adverse impacts to non-covered sensitive species resulting from implementation of the Conservation Plan.

IM-1: To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP Conservation Plan on non-covered sensitive species. To the extent practicable, establishment and management of LCR MSCP-created habitats would avoid removal of existing cottonwood-willow stands, honey mesquite bosques, marsh, and backwaters to avoid and

minimize impacts on habitat they provide for sensitive species. Temporary disturbance of sensitive species habitats, however, may be associated with habitat creation and subsequent maintenance activities (e.g., controlled burning in marshes and removal of trees to maintain succession objectives). LCR MSCP conservation measures that could result in such temporary disturbances would, to the extent practicable, be designed and implemented to avoid or minimize the potential for disturbance.

IM-2: To the extent practicable, avoid disturbance to non-covered sensitive species' important habitat areas. Lands under consideration for acquisition as conservation areas would be surveyed to determine if sensitive species habitats (e.g., high density use areas) are present. If present, important habitat areas would be delineated and, to the extent practicable and consistent with LCR MSCP biological goals and objectives, LCR MSCP conservation areas would be designed to avoid removal of the important habitats.

IM-3: To the extent practicable, avoid and minimize disturbance of non-covered sensitive species during the breeding season. To the extent practicable, activities associated with establishment and management of conservation areas would not be implemented during the breeding season of sensitive species that are present in conservation areas to prevent injury or mortality of eggs and young birds unable to avoid these activities.

Mitigation Measures

BIO-1 Conduct site-specific surveys for non-covered sensitive species during selection of land cover type establishment or enhancement (e.g., existing backwaters) areas and, if any are found, then implement measures appropriate for the specific site and species to avoid or minimize impacts to the extent feasible without causing impacts on covered species. These may include measures specified in the Conservation Plan to avoid or minimize potential effects on covered species (e.g., scheduling to avoid breeding times). (*Addresses Impact BIO-6*)

Residual Impacts

Residual impacts of **Impact BIO-6** would be *less than significant* with implementation of **Mitigation Measure BIO-1** since the Conservation Plan contains adequate measures to avoid or minimize impacts on non-covered sensitive species, as well as covered species.

3.4.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented because compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.4.2.4 below), as well as along the LCR. **Impacts BIO-2 through BIO-9** generally apply to this alternative since it is likely that conservation measures similar to those included in the proposed action would be implemented. **Impacts BIO-10 and BIO-11**, discussed in section 3.4.2.4, also would apply because some conservation could occur along the Virgin and Muddy rivers and could affect native fish species. Under this alternative, compliance and permit requirements would be implemented on a case-by-case basis, unlike the proposed action. The expected differences between this alternative and the

proposed action, in addition to those impacts related to native fish along the Virgin and Muddy rivers, are as follows:

- The fund for projects to protect and maintain existing native habitat would not be provided; thus, there likely would be a reduction in the overall availability of habitat for all sensitive species along the LCR due to a loss of habitat that would have been preventable through the funding of pending projects.
- Implementing individual project mitigation programs would not be likely to provide the regional wildfire suppression and law enforcement funding proposed in the Conservation Plan, which would result in less protection for habitat for all sensitive species.
- The absence of coordinated monitoring and adaptive management among individual mitigation programs would create more uncertainty in the success of habitat establishment and maintenance, which would likely reduce the benefits to covered species.
- The increased number and reduced size of mitigation sites that would result from individual projects would have reduced benefits for species due to limitations on site design criteria, such as inadequate patch sizes to meet territorial needs of species, increased edge effects, and inability to develop integrated mosaics of habitat to provide all of the constituent elements of each species' habitat. This primarily would reduce the benefits to the bird species that use the cottonwood-willow and honey mesquite habitat types, but also could affect marsh birds.
- The smaller size of mitigation sites required as mitigation for individual projects would result in limitations on site selection criteria and would likely cause the mitigation to be located in more developed areas where land has been subdivided. Site selection would be focused more on the proximity to the implementing entities' facilities and less on proximity to existing land cover types that provide habitat for covered species or other mitigation sites. This would reduce the benefits provided to the covered species, particularly bird species.
- The establishment of a larger number of smaller-sized mitigation projects would result in increased need for infrastructure (access roads and irrigation pipelines/canals and pump facilities), which would likely cause additional air quality and noise impacts from maintenance and operations, as well as physical disturbances to species from these activities. This would increase adverse impacts on all terrestrial sensitive species.

Mitigation Measures

Mitigation measures would be developed as appropriate in the course of project-specific environmental reviews. If significant impacts are identified, mitigation measures similar to those identified in this EIS/EIR (**Mitigation Measures BIO-1 and BIO-2**) could be implemented. Developing and implementing such mitigation measures is outside the authority of the lead agencies and is beyond the scope of this EIS/EIR.

1 *Residual Impacts*

2 Residual impacts would be *less than significant* because mitigation measures are available that
3 would reduce or avoid significant impacts to biological resources.

4 **3.4.2.3 Alternative 3: Listed Species Only**

5 **Impacts BIO-2 through BIO-9** apply to this alternative. This alternative would provide
6 coverage only for those species listed under the ESA, and would differ from the proposed
7 action in that no honey mesquite and less acreage of cottonwood-willow (4,455 acres) and
8 marsh (382 acres) land cover would need to be established to provide covered species habitat.
9 The ecosystem-wide benefits of establishing these habitats would be incrementally less than
10 those of the proposed Conservation Plan, although still they would still occur. All impact
11 avoidance and minimization measures that are part of the Conservation Plan would apply to
12 this alternative.

13 *Mitigation Measures*

14 **Mitigation Measure BIO-1** applies to this alternative.

15 *Residual Impacts*

16 Residual impacts would be *less than significant* since the Conservation Plan contains adequate
17 measures to avoid or minimize impacts on non-covered species, as well as covered species,
18 impacts on native species would be minimized and populations would be retained in the
19 backwaters, and the wetlands disturbed or lost would be replaced at a ratio that offsets the
20 temporal loss.

21 **3.4.2.4 Alternative 4: Off-Site Conservation**

22 As noted in section 3.9, Hydrology, a hydraulic connection exists between flow in the Bill
23 Williams River and groundwater in the alluvium along the river. The establishment of land
24 cover types that provide new habitat for covered species along the Bill Williams River on
25 existing agricultural lands may result in a change in groundwater flow availability for existing
26 land cover types downstream. The extent of change in groundwater flow would be dependent
27 on the amount of water used to establish the new vegetation versus what is currently used for
28 the agricultural operations. As described in section 2.1.4.2, the use of existing appropriative
29 water rights for LCR MSCP conservation projects ensures that the water use is in compliance
30 with Arizona law, under which the Bill Williams River is fully appropriated. Through the use
31 of water from these sources, implementation of the Conservation Plan would not increase the
32 amount of water used from the Bill Williams River. Irrigating newly developed land cover
33 types to provide habitat for covered species in this off-site conservation area could, however,
34 result in a continuation of unquantified adverse impacts on groundwater flow to the existing
35 habitats on the Bill Williams River NWR resulting from the ongoing agricultural operations if
36 the new habitat require a similar amount of water as the ongoing operations.

37 **Impacts BIO-2 through BIO-9** would generally apply to Alternative 4, although the locations of
38 most beneficial and adverse effects would differ. As described in section 2.1.4, Alternative 4

includes the same measures that are part of the proposed action, although habitat establishment and enhancement measures (with the exception of those relating to fish) would occur at locations to be determined along the lower Virgin and Muddy, lower Bill Williams, and lower Gila rivers. These measures would be undertaken in areas that are of low biological value and not likely to be currently occupied by covered species as described in the Conservation Plan. The impacts of implementing components of the Conservation Plan at these locations would be similar to those of the proposed action but may be lower in cases where covered species are not present. Impacts on non-covered sensitive species, however, would likely be similar. Habitat maintenance and certain types of conservation actions would continue along the LCR mainstem as identified in the Conservation Plan.

Impact BIO-10: Land cover type establishment and maintenance activities could result in periodic short-term impacts on sensitive and common native fishes inhabiting the Virgin and Muddy rivers. Land cover type establishment/enhancement- and maintenance-related activities would likely involve operation of equipment in or near channels occupied by sensitive and common native fish. These activities would result in short-term harassment of individuals present in or near construction areas. Operation of equipment to install or improve irrigation-related infrastructure in or near channels could also affect individuals by releasing sediments, temporarily reducing water quality and increasing turbidity. Impacts on non-covered sensitive species, such as the Virgin River spinedace, would depend on the specific location and type of activities conducted for vegetation establishment. These impacts would be *less than significant* because they would be of short duration, would occur infrequently over the term of the LCR MSCP, and would be minimized through implementation of BMPs to minimize effects on water quality and turbidity. In addition, since the Federally listed as endangered Moapa dace, woundfin, and the Virgin River population of the Virgin River chub are not addressed in the LCR MSCP HCP, implementation of conservation measures that could affect these species would require additional ESA compliance. Impacts on those three species would be ensured to remain *less than significant* as a result of the terms and conditions that would be part of the BO(s) issued by the Service.

Impact BIO-11: Construction to establish/enhance native land cover types could result in the long-term loss or degradation of sensitive native fish habitats in the Virgin and Muddy rivers. Sensitive native fish habitats could be lost or degraded if the establishment of land cover types and associated infrastructure results in long-term modification of river channels or flow conditions. If this were to occur, the effects on fish habitat would be a *significant impact but mitigable* through the implementation of **Mitigation Measure BIO-2**, because restoration activities would be sited to avoid impacts to covered species and impacts of restoration activities would not increase impacts of existing baseline conditions (e.g., water diversions). Because the Federally listed as endangered Moapa dace, woundfin, and the Virgin River population of the Virgin River chub are not addressed in the Conservation Plan, implementation of proposed conservation measures that could affect these species would require additional ESA compliance before the actions could be implemented.

Mitigation Measures

Mitigation Measure BIO-1 applies to this alternative.

1 **BIO-2** Design site-specific land cover type establishment plans to avoid and minimize potential
2 effects on sensitive native fish habitats along the Virgin and Muddy rivers. Preparation
3 of the design plans shall be coordinated with and approved by the Service as part of
4 section 7 consultation. If appropriate, design plans shall include measures to rehabilitate
5 any affected habitat. (*Addresses Impact BIO-10*)

6 *Residual Impacts*

7 Residual impacts from **Impact BIO-6** after the implementation of **Mitigation Measure BIO-1**
8 would be *less than significant* since the Conservation Plan contains adequate measures to avoid
9 or minimize impacts on non-covered species, as well as covered species; impacts on native
10 species would be minimized and populations would be retained in the backwaters; and the
11 wetlands disturbed or lost would be replaced at a ratio that offsets the temporal loss.
12 **Mitigation Measure BIO-2** would reduce **Impact BIO-11** so that residual impacts would be *less*
13 *than significant* because avoidance/minimization measures and rehabilitation of habitat would
14 be part of the ESA consultation, which would ensure that restoration activities would be sited to
15 avoid impacts to covered species and that impacts of restoration activities would not increase
16 impacts of existing baseline conditions (e.g., water diversions).

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